McGRAW-HILL COMPANY OF CALIFORNIA
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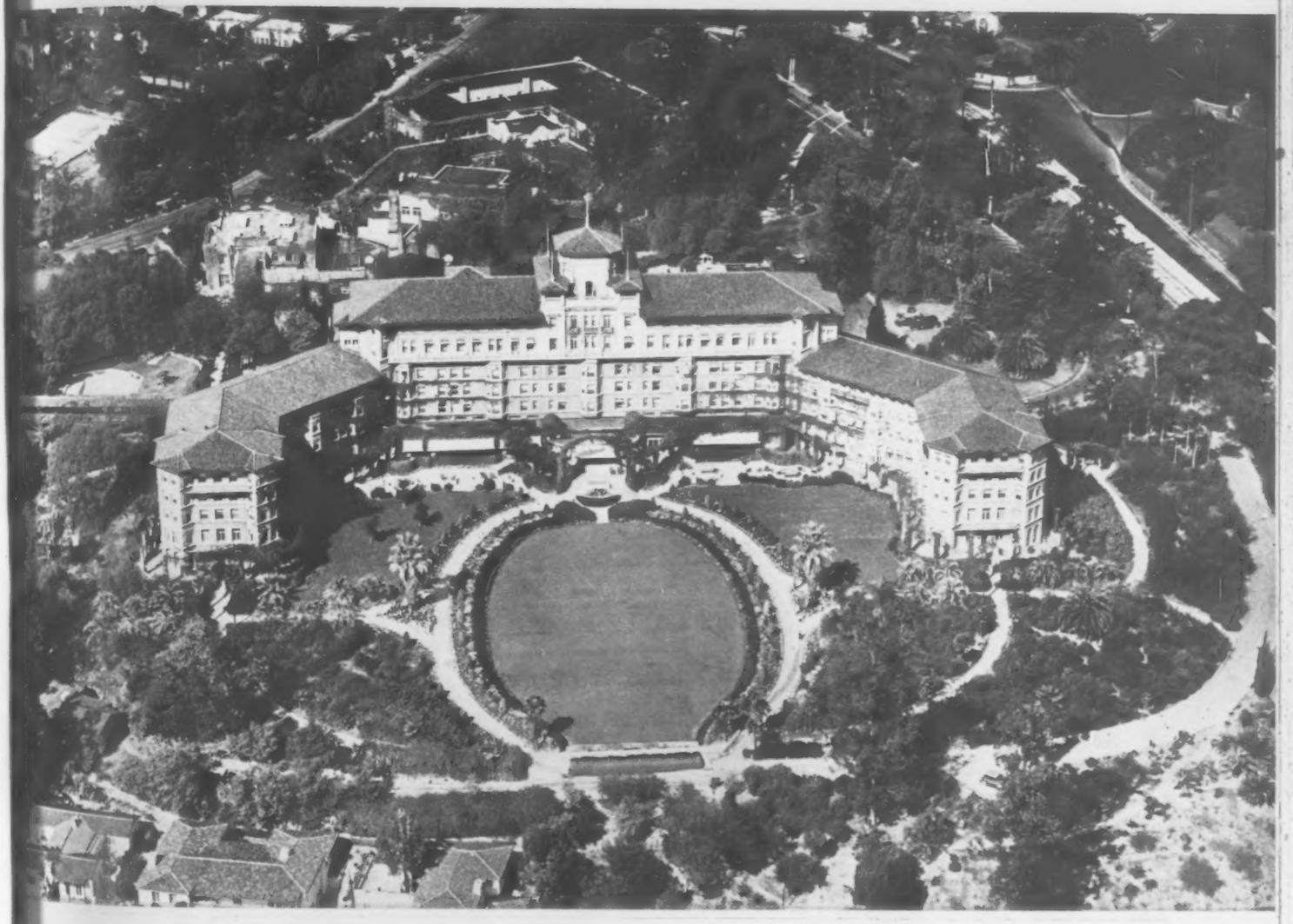
MAY 1937

# ELECTRICAL WEST



• • • Hotel Huntington, Pasadena, Where P. C. E. A. • • •

• Will Hold First Convention in Five Years •

• May 20 and 21, 1937 •

# Selling an idea

Consistent educational advertising on the part of the Edison Company has dramatized and sold the idea of the All-Electric Kitchen until today it is the accepted goal in thousands of California homes. In thus promoting greater consumption of electric power, Edison has also opened vast new markets for the appliance dealer, and the electrical contractor. Continuous selling pressure on the part of the dealer means a steady stream of added profits and substantial progress toward complete electrification.

5-37

**SOUTHERN CALIFORNIA**

**EDISON COMPANY LTD.**

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# ELECTRICAL WEST

WITH WHICH ARE CONSOLIDATED THE "ELECTRICAL JOURNAL," THE "JOURNAL OF ELECTRICITY, POWER & GAS," AND THE "JOURNAL OF ELECTRICITY"

ESTABLISHED 1887

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CONTRACTORS will find a report of the Northern California Chapter meeting, in Fresno, on page 48. Laurence W. Davis, N.E.C.A. manager, spoke—he came West to pave the way for the national convention in Los Angeles, in October.

ENGINEERS are offered P.C.E.A. papers in this month's engineering section, page 25. The first of these deals with balancing large hydro-electric units.

MERCHANDISING men can find ideas in the story of Los Angeles' cooperative range selling drive, which last month sold close to 700 units there—and in the northern California, Appliance Society drive. Both are covered under Cooperation, page 33.

MAINTENANCE engineers will enjoy a page of their own henceforward. This month it is page 52.

EVERYONE concerned with a company, inside or out, will find an answer to this question: "What is "The Company"?", on page 23.

### NEXT MONTH

Convention-in-Print. Those who go to Hotel Huntington, Pasadena, May 20-21, will welcome the June issue—a permanent record of the P.C.E.A. convention in which they will have participated. Those unable to go, will from another standpoint, appreciate this complete report. To members of the N.W.E.L.&P.A., Convention-in-Print will be *the* convention. To everyone, as for the past four years, this record of the electrical year will be an inspiring account of western progress.

By Ewing Galloway, N. Y.

**To many contractors and builders, the long-established G-E Wiring Materials line has come to be known as "Old Faithful"—the line they can depend on.**

**It's "Old Faithful" because it is so well known and has received preference so long. It's "Old Faithful" because it is a complete line composed of wiring materials that are quality-built for enduring service . . . Because it keeps apace of wiring needs and sets the standard for the electrical trade.**

**Whatever your wiring needs, whether conduit products, wiring devices or wire and cable, or all of them, the G-E Wiring Materials line will give complete satisfaction. For complete information, see your nearest G-E Merchandise Distributor, or write to Section CDW-925, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.**

# GENERAL ELECTRIC

## WIRING MATERIALS

APPLIANCE AND MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

# "it's Checkup Time" for SERVICE STATIONS Now

**TAKE your Benjamin Manual "What Every Service Station Operator Should Know About Lighting" and compare your station lighting with the lighting layouts shown in this book. Before you go into your busy season satisfy yourself that you've done everything possible to increase your business with light. Perhaps you need another Benjamin Duo-Service Floodlight, Column-Lite or Service Lite—but whatever your checkup shows you need, get it. The best investment you can possibly make to increase gallonage is good lighting.**

**You are sure of getting this good lighting when you purchase or specify Benjamin equipment. It is especially designed for Service Station Lighting by Benjamin Illuminating Engineers based upon their experience in floodlighting thousands of service stations.**

**If you haven't received your copy of the Benjamin Manual for Service Station Operators, a free copy is yours for the asking . . . just mail the coupon below. Then call your local electrical contractor or your local light and power company and learn how inexpensive it is to have your station properly lighted. Benjamin Electric Mfg. Co., Des Plaines, Illinois.**

**Benjamin**
**DUO-SERVICE FLOODLIGHT**

This patented 2 in-1 Floodlight has (1) an inner floodlighting projector which SPOTLIGHTS THE BUILDINGS and (2) a diffusing reflector which FLOODLIGHTS THE GROUNDS. Floodlighting with Benjamin 2-in-1 Duo-Service Floodlights costs no more—often not as much—as less effective lighting

**Benjamin**
**COLUMN-LITE**

Essential to the proper lighting of pump islands and the merchandise displays at the island. Increases station attractiveness, speeds service, increases sales and profits. A Porcelain Enameled, weatherproof fixture, available in choice of colors.

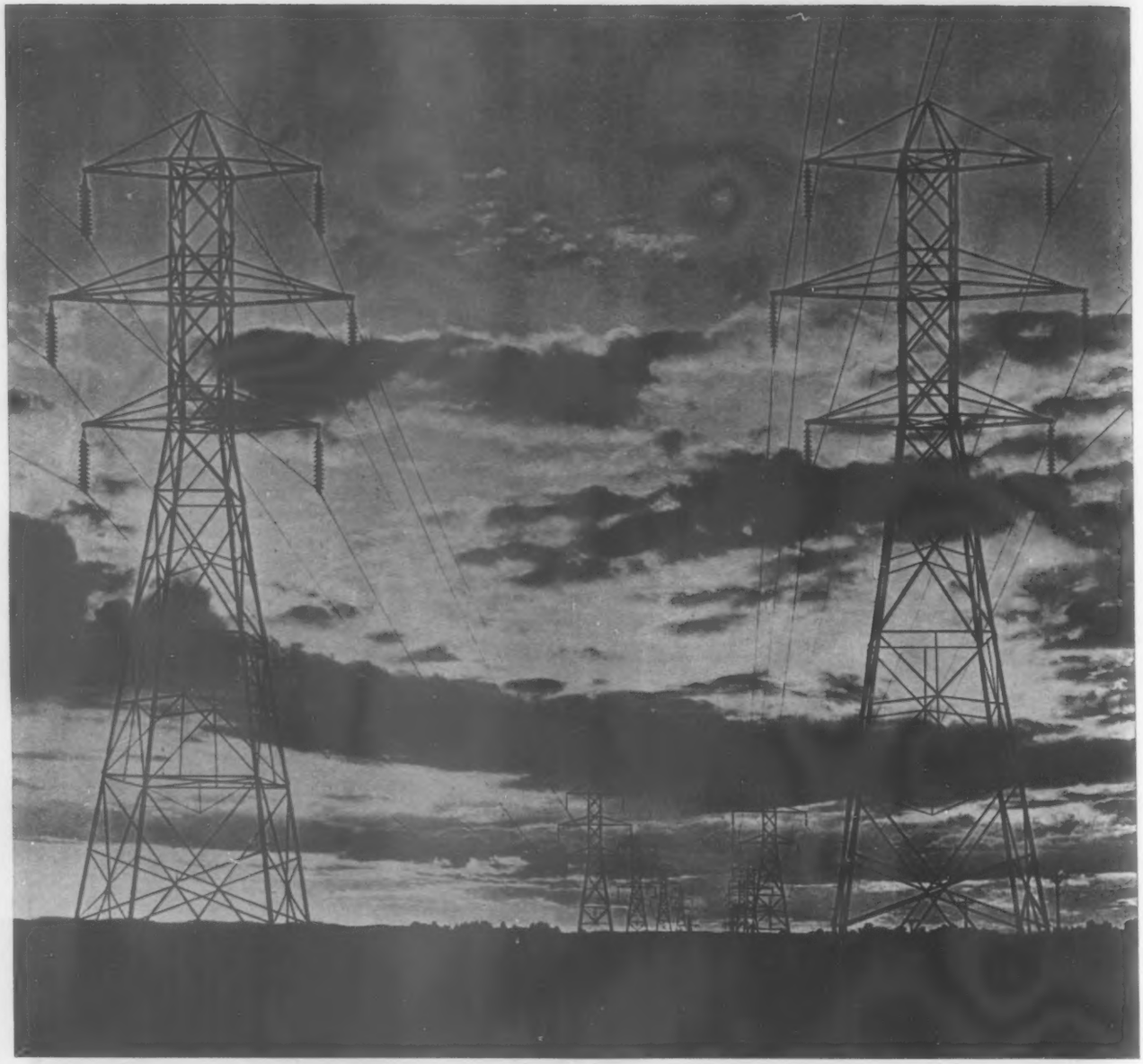
**Benjamin**
**SERVICE-LITE**

A handy, telescoping, portable, work light which is particularly useful for lighting touch up, repairing, washing and polishing operations on motor cars. Every service station should have one.

**BENJAMIN**
TRADE MARK
**LIGHTING EQUIPMENT**

**ELECTRICAL CONTRACTORS**

This is one of the series of Benjamin advertisements appearing in the leading service station magazines. It is a part of Benjamin's comprehensive sales promotion program to help you sell more floodlighting and other lighting equipment to service stations. Write for details.



A·C·S·R

FOUR letters standing for Aluminum Cable Steel Reinforced stand also for an engineering and research service which works shoulder to shoulder with transmission engineers to achieve maximum economy with highest standards. This research has produced such notable achievements as complete vibration control with Armor Rods and the Stockbridge Damper. Maintaining this program is one phase of a long-standing effort to increase the usefulness and economic benefits of Aluminum. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.

ALUMINUM COMPANY OF AMERICA

ALCOA

# NEW

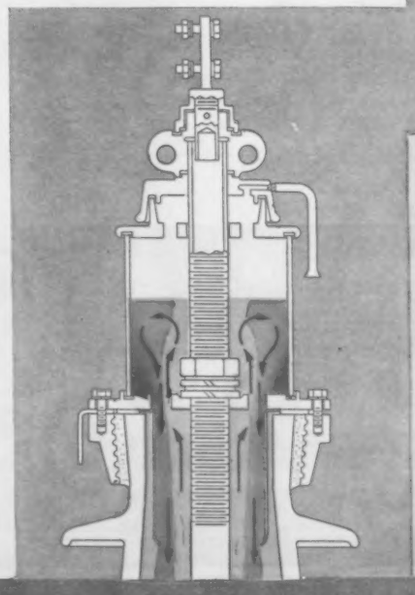
## The THERMAL SEAL

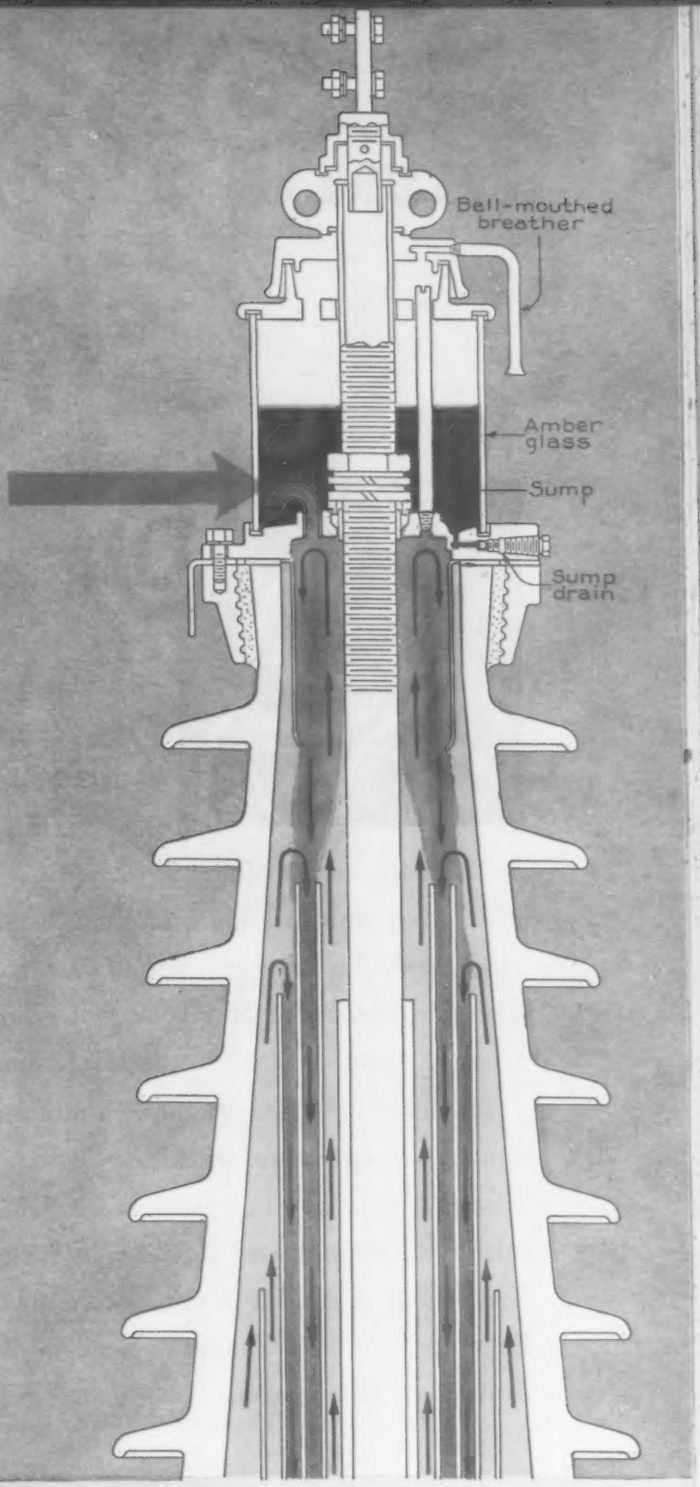
## Cuts Bushing Maintenance

THE thermal seal with which G-E oil-filled bushings are equipped is a simple, reliable device based on the well-known thermal principle of the heat trap. It prevents exposure of the bulk of insulating oil to air, eliminating the moisture absorption which such exposure entails. The seal extends the life of the oil and insulation, and maintains the initial low power-factor of the bushing — a positive indication that bushing reliability is improved and thus that service interruptions because of bushing failures can be prevented.

The thermal seal is one of the several features that make the interior of G-E oil-filled bushings independent of weather conditions, and practically eliminates maintenance of bushing interiors.

The thermal seal is designed so that it can be applied at small expense to existing oil-filled bushings. Reconditioned and modernized with this device, existing bushings can be returned to service in a condition comparable to new bushings. General Electric, Schenectady, N. Y.






***The Thermal Seal.*** *In these sectional views, the arrows show the natural circulation of oil throughout the internal insulating structure of the bushing, due to differences in temperature. The darker the green, the cooler the oil. Note how, in the absence of the thermal seal, at left, the oil circulates freely from the bushing to the expansion chamber. In the new G-E bushings, above, there is only one opening between bushing and expansion chamber. Connected to the opening is an inverted "U" tube which forms the thermal seal or heat trap, which, while it allows for the very small movement caused by thermal expansion and contraction of the oil, prevents all free circulation between the bushing and expansion chamber.*



310-20

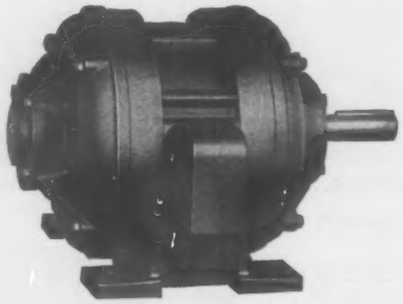
GENERAL ELECTRIC

# "HUMAN BLOOD IS ALL OF ONE *Color*"

• • • that's an old, old proverb; and true in so far as it goes, but its superficiality makes it a fundamental falsehood. For, though all blood is red, the microscope quickly reveals startling differences in its character.

Some people are inclined to think that all motors are "of one color," so to speak . . . dimensions and electrical characteristics identical—prices about the same. But put a microscope on them! Here is how an Allis-Chalmers Motor looks under the microscope: ample insulation, with a big added margin for mechanical durability . . . studied use of steel throughout . . . cast steel frames . . . rugged cast iron housings . . . heavy bearing enclosures. The sturdiest motor on the market—bar none; which means long life and maintenance costs reduced to the minimum.

And cast steel construction in motors is no innovation, no experiment with Allis-Chalmers. We have always recognized the value of cast steel parts, for inherent strength and rigidity, in motor construction and have used it in our motors for many years. Examine the Allis-Chalmers motor critically—and draw your own conclusion.



*The Allis-Chalmers Mfg. Co. builds standard motors of every type from 1 hp. up—also motors for special application*

MOTOR DIVISION

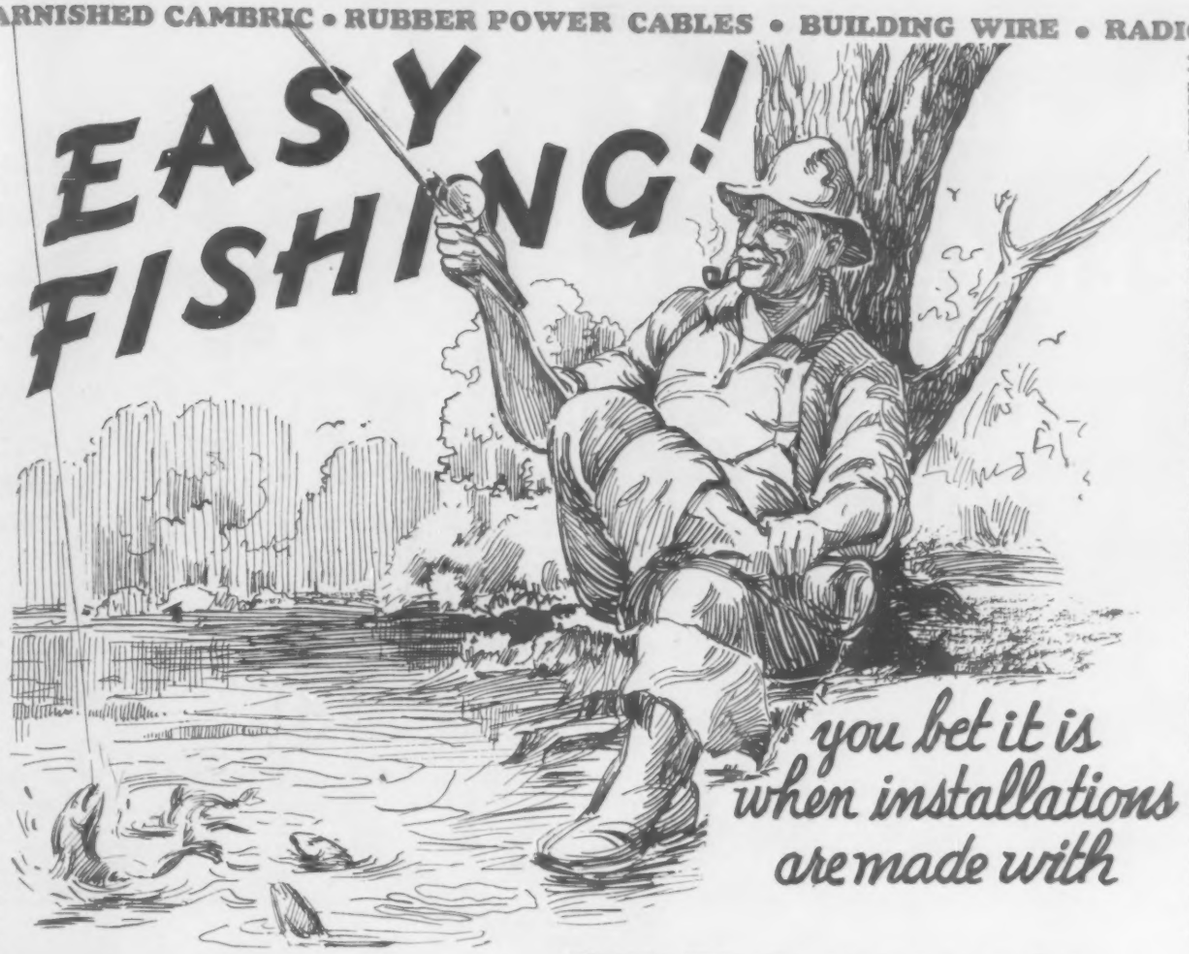
ALLIS-CHALMERS

MILWAUKEE WISCONSIN

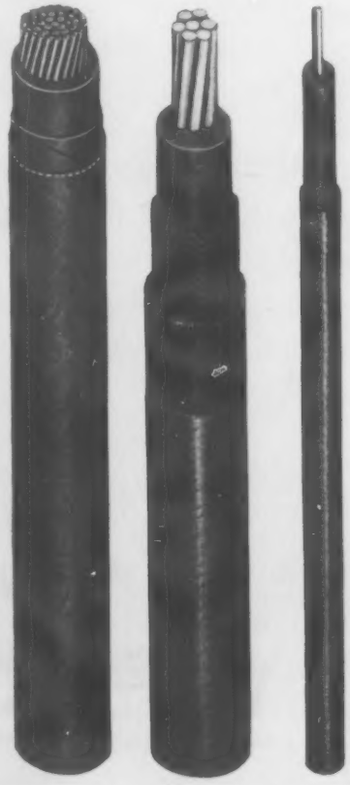
VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

# EASY FISHING!



*you bet it is when installations are made with*



# CRESCENT
## SAFECOTE
## WIRE and CABLE

**Wire that's easy to "fish" makes it easy for the men on the job—and easy for you in the reduction of time and labor costs. CRESCENT SAFECOTE Building Wires and Cables have a smooth, firm surface, lubricated sufficiently for easy pulling. They do not stick to the conduit or other conductors and relieve the strain on the insulation and copper. In addition they are moisture resisting, flame retarding and finished in bright, permanent colors for easy polarity identification.**

CRESCENT
INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

WESTERN REPRESENTATIVES

LOS ANGELES
Henger-Seltzer Co.
945 E. Pico St.

SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY, MO.
W. F. Howe,
526 Law Bldg.

CRESCENT ENDURITE SUPER-AGEING INSULATION • WEATHER-PROOF WIRE

# FOR DURABILITY AND PERMANENCE USE OKONITE *and* MANSON TAPES

The word OKONITE or MANSON on a roll of tape means that under all manner of conditions, in every kind of weather and service, these tapes stand the siege of time. Day in and day out, year in and year out, these tapes last. They last, in fact, just as long as the insulation on the wire itself.

The lifetime of a splice made with OKONITE and MANSON Tape is, therefore, equal to the lifetime of the wire. Durability, permanence—factors of true economy in the maintenance of your lines—are thus assured when you specify:

**OKONITE TAPE**—a rubber insulating tape, made of highest grade rubber and compounding ingredients that form a homogeneous mass of high dielectric strength and impervious to moisture.

**MANSON TAPE**—a rubber filled cloth tape for the mechanical protection of joints. Made by true friction method, this protective tape is unequalled in its adhesive qualities and length of service.

*Write for samples and our booklet, "Splices and Tapes"*

**THE OKONITE COMPANY**
Founded 1878
and
HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE COMPANY, INC.
EXECUTIVE OFFICE: PASSAIC, N. J.

New York · Boston · Chicago · Detroit
Philadelphia · Pittsburgh · Washington · San Francisco
Los Angeles · Seattle · Buffalo · Dallas · Atlanta

Factories: Passaic, N. J. · Wilkes-Barre, Pa. · Paterson, N.J.

GREATEST RESISTANCE TO LIGHTNING SURGES...another high spot in

TODAY'S TREND TOWARD PYREX POWER INSULATORS

PYREX is a Trade Mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

# A Store Without Windows

**The only daylight that reaches the interior of the modern building housing the great Eastern store, Huntington Park, Calif., is the little that is admitted through the glass in the front and side doors. All lighting is from recessed "Pittsburgh" Permaflectors used with flush type fixtures and from "Pittsburgh" Lustroliers.**

Above—All space on the first floor as well as on the second floor is lighted from flush fixtures in the ceiling, except the well in which is installed three "Pittsburgh" No. 5100 Lustroliers with thousand watt lamps.

Below—The third floor of the building is lighted by 169 fixtures recessed in the ceiling with a special made hinged unit, equipped with 12" x 12" square Tuf-flex glass. These units are equipped with B-508 Permaflectors with 300-watt inside frosted lamps. In the extreme front of the space shown are four rooms equipped with special made fixtures using P-40 Permaflectors.

Display windows are equipped with 150 Permaflectors No. 85 and 99, the latter being equipped with 300-watt lamps.

**The average intensity throughout the store is 20-foot candles. The ceilings are 10′ 4″ high with built-in units spaced on approximately 10½′ x 11′ centers.**

***Write to our nearest representative for complete details on built-in direct and indirect lighting. He will be glad to work with you in solving any problem.***

**PITTSBURGH**
**Reflector Company** **Pittsburgh**

FRANK E. HASTINGS
810 Transportation Building
LOS ANGELES

HAL A. GARDNER
807 Flatiron Bldg.
544 Market St.
SAN FRANCISCO

Pittsburgh Permaflector

RAYMOND ACKERMAN
318 Dooly Block
SALT LAKE CITY

LYMAN D. MORGAN
239 Securities Bldg.
SEATTLE

# Westinghouse

## $1 for your old Iron

## 1937 CAMPAIGN

## THE VICTORY BANNER FOR YOUR *Iron Sales Battle*

The greatest iron selling event of the year! . . . proved in action as the most successful campaign theme in the industry . . . and actually *getting better* from year to year.

Westinghouse originated this effective sales idea and now, for the first time, gives it broad, nationwide advertising support in full color newspaper pages.

## NEW POWER FOR '37

Westinghouse will blaze this story to 12¼ MILLION families . . . all located in the local markets of Westinghouse Iron Dealers.

There's power! . . . power to sell these NEW Westinghouse Irons faster than you've ever sold irons before.

## THE BIGGEST AUDIENCE

Tie up with this nationwide selling event that is *concentrated on local markets like yours;* giving you the largest audience ever assembled for a "Buy Now" iron selling event.

***Your Westinghouse representative can tell you HOW MANY members of this great audience are IN YOUR COMMUNITY. He can tell you the big volume, fast-turning, full-profit story.***

**Get the news EARLY . . . for an early start.**

EVERY HOUSE NEEDS

# Westinghouse

THE LINE OF LEAST RESISTANCE

# "PANCAKE" WIREMOLD

## UNLIMITED OPPORTUNITY to please old customers and

**No. 1524**
**Telephone Outlet**
A practical answer to the demand for safe and convenient connections — and uninterrupted service

### FOR TELEPHONE AND BUZZER WIRES

Pancake Wiremold meets the demand for a practical overfloor raceway for buzzer and telephone extensions to desks and other equipment standing away from wall. Pancake Wiremold may be connected to 200, 500, 700 or 1100 Wiremold. It may also be connected directly to floor boxes.

### EDUCATIONAL CAMPAIGN!

Through advertisements and mailing pieces reaching Architects, Engineers, Building Managers and Rental Agents—showing application of Wiremold to offices, apartment houses, hotels, stores and public buildings—The Wiremold Company is creating much potential business for the electrical industry. Tie in with it!

CAPACITY: FIVE TWISTED PAIR (22 GAUGE)

**The WIREMOLD COMPAN**

**WESTERN SALES REPRESENTATIVES**

SEATTLE
F. A. Strohecker
2207 First Avenue, S
Elliott 0350

PRINT IN BINDING

# CREATES WIRING JOBS

## win many new ones - - - by eliminating loose cord nuisance!

### FOR POWER AND LIGHT OUTLETS

Pancake overfloor raceway, for power and light circuits, provides a simple and inexpensive method of locating or relocating floor outlets to suit exact requirements of office or lobby layouts. Shifted at will without channelling floor or marring floor covering. May be connected to 200, 500, 700 or 1100 Wiremold—or directly to floor boxes.

**No. 1543**
**Duplex Receptacle**
Quick, safe, sure, trouble-proof connection for desk lamps and appliances, etc.

Listed by Underwriters Laboratories

CAPACITY: 4 NO. 12 WIRES

### FREE BLUE PRINT LAYOUTS

The Wiremold Company's planning department is prepared to supply blue prints and detailed information on Wiremold installation problems of all kinds on request. If your customer puts a hard problem up to you, pass it on to us. Let us help you give your prospect what he wants.

### ARTFORD, CONN.

LOS ANGELES
Frank J. Airey Co.
1855 Industrial St.
Michigan 7981

SAN FRANCISCO
George A. Gray
1250-1252 Folsom St.
Hemlock 1527-1528

# Now! Hotpoint OFFERS THE DORCHESTER RANGE in either full Porcelain or Calgloss Finish!

## HOTPOINT CALROD

*The Fastest, Most Durable Electric Cooking Unit in the World! By Actual Test!*

The new Flat-top, metal-sealed Hi-speed Calrod heating unit brings greater speed, durability, and economy to electric cookery. These facts have been *proved* by a nationally recognized, independent testing laboratory. Calrod is standard equipment on Hotpoint Ranges. That's just one more reason why Hotpoint Electric Ranges with Calrod units sell fast and stay sold!

**THE DORCHESTER**
*Hotpoint's 1937 built-to-the-floor d[illegible] range. Modern in style. Modest in p[illegible]*

**Sensational public acceptance has proved the Dorchester's right to be known as the finest built-to-the-floor electric range ever offered at such an astonishingly low price.**

**Now in answer to popular demand, Hotpoint offers the Dorchester in two models; identical in features and styling; different only in finish and price. In both models the range top is finished in white, stain-resisting porcelain enamel. On the Porcelain Dorchester, balance of range is finished in regular white porcelain enamel. On the Calgloss model, the oven door front is white porcelain enamel, balance is white Calgloss baked-enamel.**

**The Dorchester's full, family size, brilliant beauty and deluxe equipment have previously been available only in higher priced ranges. Its introduction has opened up a big, new market for electric cookery sales—a market you can't afford to neglect. Descriptive literature and complete merchandising information can be obtained from your nearest Hotpoint district representative.**

***THE NAME EVERYBODY KNOWS***

# Hotpoint

ELECTRIC RANGE[illegible]
AND REFRIGERATO[illegible]

WATER HEATERS • DISHWASHERS • HOME LAUNDRY EQUIPMENT

# AND . . . A TESTED PLAN FOR SUMMER PROMOTION

## ONLY HOTPOINT *offers all these features*

"CHEF'S BRAIN"!—Automatic oven timer-clock at slight additional cost.

THERMOSNAP OVEN Temperature control, easy to use, accurate.

THRIFT COOKER—Cooks whole meals on low heat; saves money and time.

CHROME LAMP with shelf containing matched Condiment Jars and Time-Chime.

BROILER—3000 Watt Hi-speed Unit broils with speed and perfection.

UTILITY DRAWER—Generous storage room for utensils. Glides on quiet rollers.

U. S. Government orders 8,480 Hotpoint Electric Ranges for PWA low-rent housing projects—largest electric range order ever placed! Added tribute to Hotpoint economy, durability and performance.

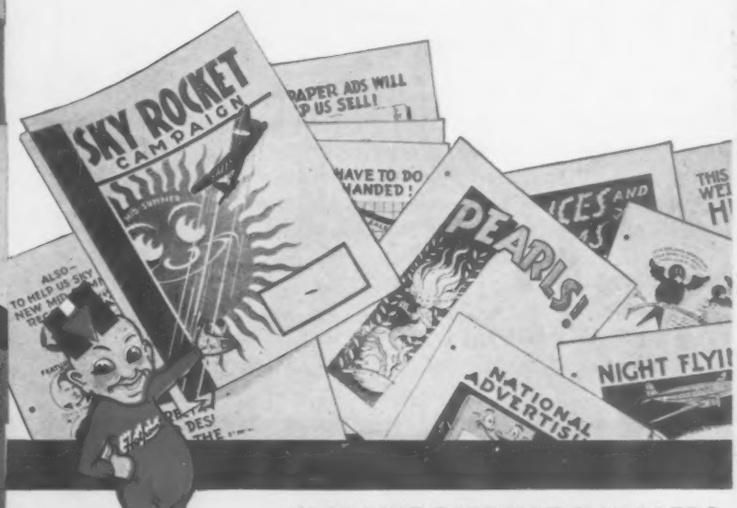
## SKYROCKET YOUR SALES WITH THIS NEW PLAN

There's a whole bag of Summer sales tricks in Hotpoint's Skyrocket Campaign—ready May 15 as part of the regular Year 'Round Program. Hot summer days make cooking by ordinary methods an experience to be dreaded—start thousands of prospects longing for the cool, clean relief of electric cookery. You can turn every heat wave into a sales wave by using Hotpoint's Skyrocket Campaign, especially designed to promote Summer sales and profits.

Get full details from the Hotpoint representative in your district! He has a Plan Book that's literally bursting with sure-pop sales ideas; packed with powerful direct mail material; crammed with seasonable newspaper advertising that can easily be adjusted to fit your needs exactly! And it's *free* for the asking!

Start planning now to reap a harvest from summer sales. Write us or communicate with our nearest representative.

**EDISON GENERAL ELECTRIC APPLIANCE CO., INC.**
5612 West Taylor Street, Chicago




### HOTPOINT DISTRICT MANAGERS WILL CO-OPERATE WITH YOU

C. P. MYRICK, Room 506, 38 Chauncy St., Boston, Mass.
HEMAN GREENWOOD, 570 Lexington Ave., New York City
M. H. BEEKMAN, Room 701, Architects Bldg., 17th & Sansom St., Philadelphia, Pa.
W. T. CHRISTY, 304 Red Rock Bldg., Atlanta, Ga.
W. H. BONDURANT, 702 Union Trust Bldg., Cleveland, Ohio
L. E. BUXTON, 5600 W. Taylor St., Chicago, Ill.
H. K. DEWEES, 5600 W. Taylor St., Chicago, Ill.
A. W. PETERSON, Room 2410, 106 W. 14th St., Kansas City, Mo.
J. T. NEE, 1801 N. Lamar St., Dallas, Texas
B. E. ROWLEY, Room 1218 Continental Bank Bldg., Salt Lake City, Utah
J. C. PLATT, 1411 Fourth Ave. Bldg. Seattle, Wash.
H. D. CONKLIN, Room 621, 601 W. Fifth St., Los Angeles, Calif.

# NEW ENCLOSED TYPE FLOODLIGHTS

## INEXPENSIVE AND EFFICIENT FOR UNIVERSAL APPLICATION

Type AV-16 and AV-20 Floodlight.

Type A-14, A-16 and A-20 Floodlight.

Type A-8 and A-10 Floodlight.

*All* the advantages of *enclosed type* floodlights are now available for universal application . . . *at low cost!*

Efficiency and construction features formerly found only in the most expensive equipment, are provided in the new Westinghouse "A" Line floods. Type A units are offered in 8, 10, 14, 16 and 20-inch sizes, and Type AV, for vertical burning lamps, in 16 and 20-inch sizes.

Both Types A and AV are constructed with reflectors finished by the Alzak process . . . a patented finish that offers higher efficiencies and can be easily maintained at maximum efficiency. And there are a host of other selling features and practical service values for any general floodlighting use.

Get all the interesting facts from your nearest Westinghouse Jobber . . . or write direct to Westinghouse Electric & Manufacturing Company, Lighting Division, Edgewater Park, Cleveland, Ohio.

TYPICAL APPLICATIONS

| | |
|---|---|
| Roadside Stands | Horseshoe Courts |
| Service Stations | Basketball Courts |
| Parking Lots | Beaches and Pools |
| Real Estate Displays | Trap and Skeet Courses |
| Store Fronts | Archery and Target Ranges |
| Signs and Displays | Tennis Courts |
| Delivery Platforms | Golf Driving Courses |
| Used Car Lots | Skating Rinks |
| Industrial Yards | Racing Tracks |
| Construction | Campus and Drill Fields |
| Docks and Piers | Airport Aprons |
| Yards and Buildings | Farms |
| Ship Yards | Homes |

*ASK YOUR WESTINGHOUSE JOBBER FOR DETAILS*

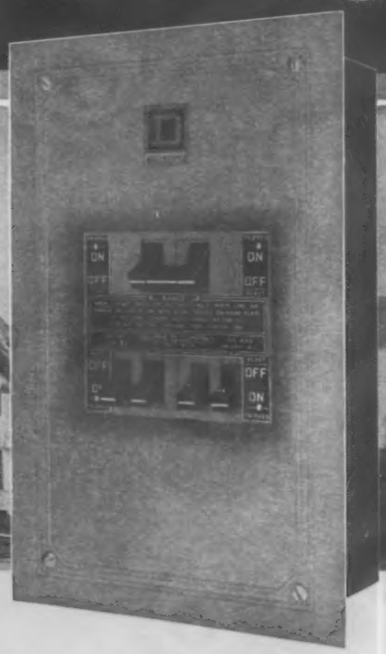
WHEN YOU THINK OF *Lighting* THINK OF

**Westinghouse**

# SQUARE D MULTI-BREAKERS

# are being sold Everywhere!..

FOR THIS LARGE HOME



FOR THIS SMALL HOME

## Present and Prospective Home Owners are Conscious of this New Low-Priced Convenience

The Square D Multi-breakeR is a proved profit item for the electrical wholesaler and contractor—proved by the fact that the Square D Multi-breakeR is being specified for large individual residences and the group construction of small, low-priced homes such as we have illustrated above.

People want the convenience of the Square D Multi-breakeR. They have indicated very definitely that they much prefer it to the usual entrance switch and fuse box with its attendant troublesome fuse changing. It has been proved that home owners and builders will pay the small additional cost for the convenience and protection which the Square D Multi-breakeR provides.

And the contractor is aware of the fact that the installation of the Square D Multi-breakeR creates wiring jobs for him!

The Square D Multi-breakeR is a profit maker for everyone concerned. If you are not now making the most of the opportunity it offers, write us for details of how you can make money with it.

*Square D electrical devices are available through electrical wholesalers everywhere*

CALL IN A SQUARE D MAN

## *Consider the Market Possibilities . . . the Merchandising Effort that is being put behind* the Square D Multi-breakeR

The present building boom opens up immense profit opportunities for you in the sale of the Square D Multi-breakeR . . . This is being verified every day by alert wholesalers and contractors who are capitalizing on the merchandising effort that is being put behind this new, low-priced electrical convenience . . . The Utilities are advocating it . . . Architects are recommending it . . . Realtors are specifying it . . . Prospective home owners and present owners who are remodeling are demanding it . . . All of these groups are being reached by Square D advertising for your benefit.

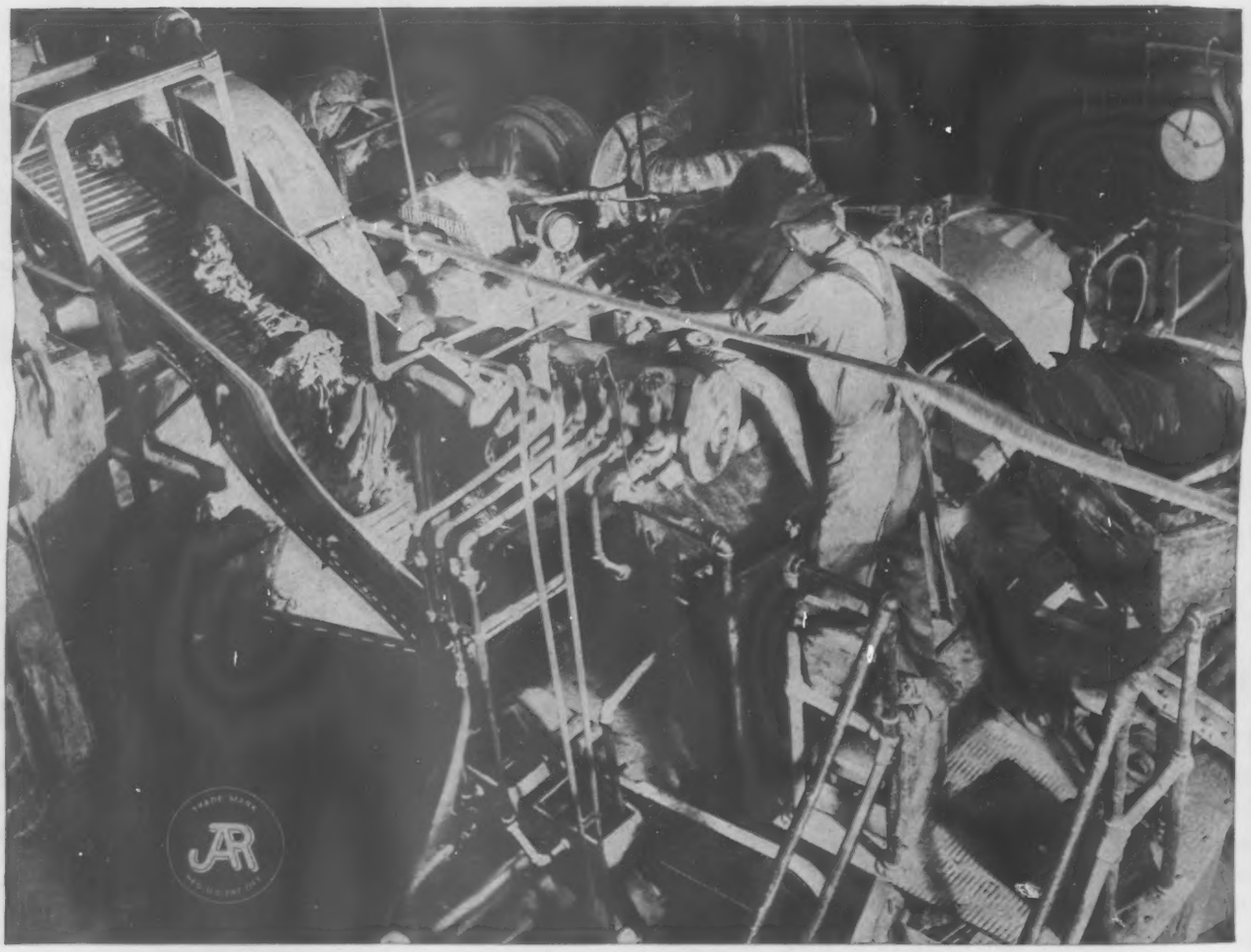
SQUARE D COMPANY

LOS ANGELES - DETROIT - MILWAUKEE

SQUARE D COMPANY CANADA LTD. TORONTO, ONTARIO

# One of the *Last Words* in Roebling Rubber Cable Making

## . . . A BANBURY MIXER



THIS maze-like Banbury Mixer assures superior rubber stock for Roebling Cable insulation. It is typical of Roebling's improved methods in the making of rubber insulated cables. From copper conductor to outer covering, closest control over material and methods guard the high quality of Roebling Power Cables every step of the way.

These cables are made in several types. We will be glad to submit samples and prices on whatever type in the following list which may interest you.

***Roebling Rubber Insulated Cables*** are made in a wide range of sizes, voltages and grades of insulation suitable for power transmission, lighting and signal service —underground, submarine or aerial. The complete line includes "SAFECOTE" Rubber Insulated and Braided Wires and Cables. Parkway, Service, Mining, Welding and Control Cables. TreeWire.

JOHN A. ROEBLING'S SONS CO.

*Los Angeles, Portland, San Francisco, Seattle*

**ONLY A FINE PRODUCT MAY BEAR THE NAME ROEBLING**

CONTRACTORS!

Easy to Sell, Easy to Wire

Don't overlook this brand new sales help with which to attract and interest prospective wiring customers. At the amazing new low prices, *Nofuze* protection can now be installed on *every* new or rewiring job, *every* range and water heater installation.

Write today for Catalog 29-300. Westinghouse Elec. & Mfg. Co., Dept. 5-N, E. Pittsburgh, Pa.

## *with* NEW LOW-COST NOFUZE CIRCUIT PROTECTION

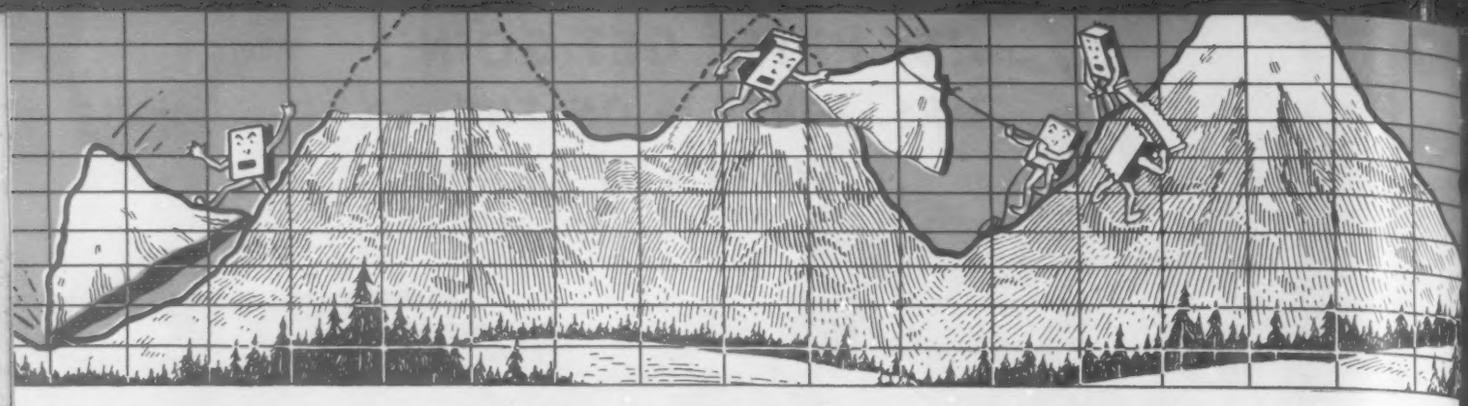
Every Power Company customer who installs Westinghouse Nofuze Circuit Protection is just one less potential source of complaint and service expense resulting from residential fuse outages. Equipped with time-proved "De-ion" circuit breakers instead of switches and fuses, even a child can restore service with the Nofuze Load Center—simply by flipping the breaker handle, first to "off" and then to "on."

Wherever customer carelessness or overloaded wiring results in numerous service calls to replace fuses, Power Companies may find it profitable themselves to install new Westinghouse low-cost Nofuze Load Centers. But regardless of who pays the initial cost, every Nofuze installation will reduce expense and build good will, both for the Power Company and for the Electrical Contractor who does the wiring!

J 60062

Westinghouse

NOFUZE CIRCUIT PROTECTION



# Off with the peaks!

## . . . and save system investment

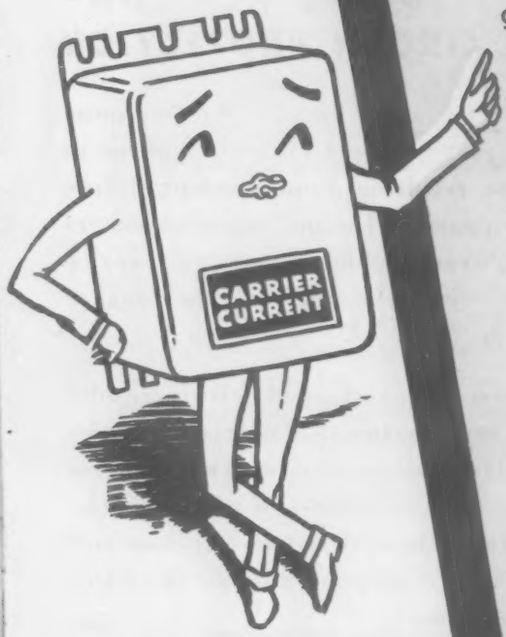
G-E CARRIER-CURRENT control will keep your water-heater load off every peak—every day, on stormy days and holidays, from one season to the next. You can avoid from a half to more than a kilowatt of system peak demand for each water heater served—when your heaters are controlled by carrier.

Investment in allocated generating and transmission equipment can be reduced with carrier as much as 70 per cent—up to 30 per cent greater savings than with any other type of control. Carrier also releases up to 65 per cent of the allocated investment in substations: feeders, distribution transformers, and secondaries—saving as much as 25 per cent more than with other control arrangements.

Under many conditions, these savings in system investment alone are from $100 to more than $500 for each water heater served.

If you have as few as fifty water heaters fed by one substation, ask your engineers to review your water-heater load and its control. The savings in power investment alone may permit carrier current to save you money. General Electric, Schenectady, New York

**IT'S NOT HOW MUCH CONTROL COSTS, BUT HOW MUCH IT SAVES**




GENERAL ELECTRIC

HERE IT IS!
A BRUSH with
MILD POLISHING ACTION
ACCURATELY CONTROLLED
Serious inconvenience and troublesome delays may be caused by the lack of some little thing, seemingly as unimportant as a collar button . . . or MILD POLISHING ACTION IN A BRUSH.

# *New* "SA" SERIES GRADES

## SA-2522 • SA-3027 • SA-3532 • SA-4037 • SA-4542

### WITH MILD POLISHING ACTION are now available:

- To maintain a clean, well polished commutator surface where gaseous contamination of the air, acid fumes or oil vapor results in troublesome deposit.
- To eliminate commutator depreciation arising from the necessity for frequent refinishing of commutator surface.
- To avoid expensive shut-downs and delays under severe load conditions.

These New "SA" Series Grades have the superior commutating properties, the low friction and the smooth riding qualities characteristic of all "SA" Series brushes. They are held to the same rigid uniformity in performance characteristics.

They supplement, but do not replace the original, entirely non-abrasive grades, SA-25, SA-30, SA-35, SA-40 and SA-45, which are still the standard of superiority for normal, heavy duty service conditions.

***Let us demonstrate these new "SA" Series Grades where you have need for a brush with mild polishing action.***

**NATIONAL CARBON COMPANY, INC.**

Unit of Union Carbide UCC and Carbon Corporation

Carbon Sales Division, Cleveland, Ohio — General Offices: 30 East 42nd Street, New York, N. Y.

BRANCH SALES OFFICES: NEW YORK PITTSBURGH CHICAGO SAN FRANCISCO

# These Companies Know

## *that FP-19 Reclosers Pay for Themselves*

## in less maintenance
## in service continuity
## in increased revenue

*COMPANY A:*
One recloser operated 24 times in two months without a lockout.

*COMPANY B:*
One recloser operated 15 times in 45 days. Finally a lockout caused by a line falling to the ground.

*COMPANY C:*
A recloser operated 16 times in one night—no lockouts.

*COMPANY D:*
Three reclosers. One operated 54 times in two months; one 68 times in three months; and one 50 times in three months.

ALL of these reclosers were equipped with operation counters, and it was easy to tell just how many times they had restored service to customers on rural power lines.

Assuming a cost of only $10 to send out an emergency crew to locate trouble and restore service, these reclosers have made a big saving.

No maintenance was required on any of these reclosers. Except in the case of the fallen line (Company B), service was maintained. So, no revenue was lost. These experiences are typical.

General Electric Co., Schenectady, New York.

THEY PAY MOST DURING THE LIGHTNING SEASON

890-34

**GENERAL ELECTRIC**

ELECTRICAL WEST

DEVOTED TO THE ECONOMIC PRODUCTION, TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER AND ITS APPLICATION TO INDUSTRY, COMMERCE, AGRICULTURE AND HOME IN THE PACIFIC EMPIRE, AND TO THE MARKETING OF EQUIPMENT AND APPLIANCES AND OTHER UTILIZATION DEVICES IN THAT AREA

MAY 1937

# What is "The Company"?

By W. C. MULLENDORE
Executive Vice-President
Southern California Edison Co. Ltd.

BY TRADITION and by habit, customers, stockholders and even employees tend to look upon a company simply as a "corporation"—an impersonal thing which is thought of and referred to as "it," an entity whose only relation to them as individuals is to sell something, to collect bills, or to pay rental for services or invested capital.

Stockholders often make this inquiry: "What is the biggest problem facing the company today?" You may be surprised to learn that my answer is not the problem of taxation, but simply the problem of public understanding. And by that I mean the problem which arises out of the misunderstanding of many who themselves are a part of the company—misunderstandings of what the company is, where it is located, and what it does.

Hindering a clear conception of what a company really is, are those helpful souls who for one reason or another seem to find peculiar satisfaction in, or to believe their personal interest will be advanced by, abusing a corporation engaged in the public service. These public-utility baiters often recklessly impugn the motives of utilities in such fashion as they would not think of doing in the case of other citizens. They insinuate that those who are connected with or who manage such an institution are fairly to be suspected of misleading the public or of overcharging, or of making unjust profits out of those whom they serve.

For example, as local citizens, conducting a local business, a company is of course expected, and quite properly expected, to take part in civic affairs, to bear its share of the expense of community chests, and of other community and civic organizations which are dependent upon the support of business men and other citizens. A company would be condemned for not participating in such activities.

Yet every now and then some utility-baiter makes a great outcry about these local contributions by the utilities, in an endeavor to leave the impression that such contributions are made for evil purposes because they come from these people engaged in this essential public service. Thus we are often condemned for performing a duty, the nonperformance of which would lead to even more severe condemnation.

One of the principal reasons why these fairy tales are "put over" or imposed upon the public is because we habitually think of a corporation im-

* Based on an address at annual meeting of stockholders of the Southern California Edison Co., Ltd., March 19, 1937, at Los Angeles, Calif.

personally. Yet a corporation is made up of human beings—it is, after all, just another form of partnership.

### Your Own Company

To appreciate that fact consider your own company as an example. Recall its history. Where did this company come from? How did it grow? This company, with its employees, stockholders and customers did not spring into being overnight. It was not built elsewhere and transported into the territory it serves. It grew up there.

And how did it grow? Well, first of all there was an idea—an idea which seized upon the imagination of electrical pioneers. Those pioneers tried out and applied their idea. They experimented; they took risks in an attempt to meet the needs of their friends and neighbors—the needs for lighting of streets, for lighting in the homes, the need for dependable power which would pump water, supply motive power, do other tasks in the homes and turn the wheels in factories. These needs grew, and as electrical appliances were developed to meet them, and as population grew, the need for more power and hence for more generating equipment and more poles and wires and substations, transformers and meters, etc., grew. And the furnishing of this equipment required capital — capital furnished by the savings of more people.

Thus the company of people who were concerned with and interested in the activities of the community grew. Thus through the years a great group of people came together in the interest of increased efficiency and improved service. Together they furnished a demand and pooled their resources to meet it.

### Where Is It?

The Southern California Edison Co. is an example. And where is this company located? It is located wherever it serves. It is not located exclusively in the high Sierras where the waters of the mountains are collected and passed through the great power houses, though up there are people who perform vital services in carrying on its work. It is not located in Long Beach where one of the greatest steam plants of the world forms a part of its property, but there also are many key people who operate a nerve-center of the company. It is not located in Los Angeles, where its main office building is, although there too are many people who constitute a part of its personnel.

No, it is located in all those places, and, in addition, it is located in every town and countryside where there are people in homes, in stores, on farms or factories to be served. It is located wherever there are people who are furnishing a part of the demand. It was brought into being and developed by and because of people (thousands and hundreds of thousands of them), who required its service, and when a customer starts taking service from it, he becomes a part of this company.

No one man or group of men, whether employees, managers, stockholders or customers, can be pointed to as the Edison company. No one big man, small man, or small group of any kind, make up this company. It is made up of hundreds of thousands of people, men and women, in all walks of life. Such is any company—a company of people.

As I said at the beginning, this is a most important problem, this one of having the public, our own people, see us as we are. Why is it important? Because, strange though it seems, it is from the prejudices aroused by defamatory criticism, from misleading insinuations which attack the company's most valuable asset—public good-will and confidence—that our most troublesome problems arise.

### Public Emotion

The idea that the company is something separate and apart from the community, that some rich man or rich men in some far-off place are profiteering through the company, etc.—these are the kind of false stories which are retailed to customers, and which tend to make them hyper-sensitive and supercritical, and thus lead to unreasonable complaints and demands.

True, there are physical obstacles which must be overcome in rendering and maintaining service. Those problems are difficult. But in those fields usually we are dealing with facts which can be ascertained, with tangible things which can be measured. It is far different in the field of those human emotions which are played upon by the appeals to prejudice which are not measurable and indeed often are not discoverable.

It is the job of the managers to see that a property is operated on a fair business basis, that electricity is furnished as economically as possible, that the costs of operation and maintenance, together with a fair payment to those who have put up the money to buy the equipment, are maintained, that the service is kept up to date—that the legitimate interests of each group and individual are protected.

Neither would I have you understand that the management of your company should be free from criticism. These agents of yours are human beings, like yourselves, and therefore subject to human errors. Mistakes have been made and more will be made. The most management can ask is that those who have a right to criticize will temper their criticism with understanding.

I have tried to emphasize the importance of the customer's attitude. If the customer looks upon the company as a neighbor, as a friend and not a stranger, and upon those who are operating the company as public servants who are working for the customers and doing the best they can—that attitude would go far toward solving many problems in public relations. It is the *cultivation* of that attitude (which I believe is the justified and proper attitude toward a community institution of which all are a part) for which we should strive.

### We All Share

There is no "private company." Each is a public company—a public institution, and a public cooperative institution.

If people would see this—could see that when taxes are heaped upon the company, they also are heaped upon the cost of electric service, could see that when the company is put to expense in defending its property against political attack—that all of us, all this great company of people who together constitute the company, have to stand part of the burden—if only this true picture of what the company is, of whom it is composed, of where it is located, could be impressed upon all who are concerned, the time now consumed in defensive efforts could be given to constructive work.

## Letters

From England, we received the following communication:

To the Editor:

I have now received a copy of the booklet "Electric service with safety" from Mr. J. W. Whittington of the Public Relations Committee of the International Association of Electrical Inspectors, and we are studying this with interest.

I am most grateful to you for arranging that this booklet be sent to us. I can assure you that we regard your magazine as quite the livest thing in electrical journalism on either side of the Atlantic, and I look forward to each issue as it reaches us.

J. Pentland
53 Parliament St.
Westminster, S. W. 1
London, England

Which we modestly present as evidence that "a prophet is not without honor, save in his own country."—Editors.

# Procedure in Balancing Large Hydro-Electric Units

## Laborious "Cut-and-Try" Methods of Eliminating Vibration on Rotating Machines Antiquated by New Technique. Balancing Equipment Is Portable, Saves Labor Costs and Reduces Time the Machine is off the line.

By J. C. GAYLORD
Southern California Edison Co., Ltd.

IT often happens that after many years of service and many overhauls large rotating machines, such as hydro-electric generating units, get out of dynamic balance. This unbalanced condition causes vibration of the unit which does a great deal of damage to the unit and attached equipment.

Until recently the balancing of large rotating machines has been accomplished in the field by cut and try methods. The results obtained have been dependent on some skill and a large amount of luck. It has been a tedious and difficult problem to determine where weight should be added or subtracted from the rotating element in order to balance it so that it would run smoothly.

Recently there has been developed equipment for solving the problem with a minimum number of trials, and it is my purpose to describe briefly the use of one kind of such equipment and the results obtained in two rather difficult and interesting cases. The equipment used was the Davy balancing equipment.

The first case was that of a 35,000 kva., 11,000 volt, three-phase generator driven by a Francis-type turbine at 375 r.p.m. This unit is located in the Big Creek No. 8 Powerhouse of the Southern California Edison Company Ltd. The vibration was entirely in the generator end of the unit and was excessive. Many attempts had been made to balance the unit by the cut and try method but with only partial success.

The second case was on the turbine runner of No. 2 Unit at Kern River No. 3. This unit is rated 17,500 kva., 10,000/11,000 volts, 500/600 r.p.m., 50/60 cycles. The unbalance was entirely in the turbine runner.

Before describing the test equipment and its use it will be best to review briefly the behavior of unbalanced rotating bodies such as the ones just referred to. When the unbalanced rotor revolves it will not rotate about its geometrical axis but the heavy side will swing it out of line. At very slow speeds the heavy side will be the one that will swing the farthest out from the axis of rotation and cause a vibration of the unit in phase with it. As the speed increases the vibratory motion will lag behind the rotation and the heavy side will no longer be the one farthest out but a side a few degrees back against rotation will swing out the most. The angle between the heavy side and the one that swings out the most will gradually increase until at very high speeds the light side, or that opposite the heavy side, will swing out and the body will be rotating about an axis through its center of gravity. The angle by which the high side (the one that swings out the most) lags behind the heavy side is called the angle of lag. The curve showing the variation of the angle of lag with speed has a similar form for all rotating bodies.

P.C.E.A. REPORT
Operating-Economics Section

The problem of balancing consists of three parts: first, to locate the high side as the unit runs at normal speed; second, to determine the angle of lag for the unit at normal speed (from these two the heavy side can be located); third, to determine how much weight must be added opposite the heavy side to bring the rotor into dynamic balance.

### Equipment

The equipment used to determine the amplitude and nature of the vibration was the Davy vibrometer. This, in connection with the hand lamp, was used to determine the high side and the angle of lag. The vibrometer is in reality a small seismograph arranged to reflect a beam of white light on a ground glass screen in such a way that the motion of the light spot on the screen represents, to a very large scale, the amplitude and kind of vibration imparted to the vibrometer by the unit being tested. The hand lamp is really a stroboscope using neon lamps, the circuit to which is interrupted by a variable speed circuit interrupter. The speed of the interrupter can be very accurately controlled. In the same circuit with the neon lamps of the hand lamp is a small neon lamp located in the vibrometer so that its interrupted beam of red light is reflected on the ground glass screen in the same manner as is the white light of the vibrometer.

The procedure is to mark large numbers at equal intervals around the shaft of the unit to be tested. These numbers are to be located so that they can be illuminated by the interrupted light from the hand lamp. Obviously if the light from the hand lamp is flashed on once each revolution of the shaft the shaft will appear to stand still and the number being thus illuminated can easily be read.

The vibrometer is set up on one end of the unit (either on a flat spot avail-

Davey vibrometer equipment used to determine the amplitude and nature of vibration on large rotating bodies. Operating on the seismograph principle, the vibrometer is arranged to reflect a white light beam on the ground glass screen (right) tracing the machine's vibration to a highly magnified scale. By stroboscopic methods, using the neon hand-lamp (left) and circuit interrupter (center) the "high spot" of a rotor can be determined by a second beam of light from a neon source also reflected on the screen

able or on a rigid bracket provided for the test) in such a way that the motion of the white light will register the vibration of the unit perpendicular to the center line of its shaft. With the generator running at normal speed, the white light will trace a figure on the screen the horizontal length of which will represent the amplitude of vibration perpendicular to the shaft. The vertical width of the figure will represent the vertical vibration. This figure may take many different forms depending on the peculiarities of the vibration of the unit being tested. The general form of the figure will usually be an ellipse.

### Finding the High Spot

The red spot on the screen made by the light of the neon lamp will move around this figure in one direction or the other, depending on whether the light is interrupted oftener or less often than once each revolution of the unit. If the red light is interrupted exactly once each revolution of the unit, it will stand still at some point on the figure and appear as a red dot at some point on the curve being traced by the beam of white light.

Therefore, if the interrupter is adjusted so that the red spot is stopped at the extreme outside of the figure (away from the shaft) and, by means of the hand lamp, the number on the shaft appearing exactly on the same side of the unit where the vibrometer is located, is read, this number will be on the side of the rotor which is swinging farthest out from the axis of rotation. This side of the rotor is called the "high side" or "high spot."

Knowing the speed and size of the unit being tested, the "angle of lag" can be estimated, or it can be determined by making several observations at different speeds or by observing the motion of the red dot as the unit is allowed to slow down. Details of the latter methods are too long for discussion here.

Having determined the "high spot" and estimated the "angle of lag," the next stop is to add a weight opposite to what seems to be the heavy side of the rotor. The value of this weight must be estimated for the first trial. After this weight is added another run is made to find out what has been accomplished. If the "angle of lag" has been correctly estimated or calculated, the "high spot" will remain the same. It will be 180 deg. from the original "high spot" if the "angle of lag" is correct and the weight added is too large to just balance the heavy side. If the "high spot" moves against the rotation of the unit, the estimated "angle of lag" is too large and vice versa.

Two or three trials make it comparatively easy to estimate the location and weight to be added. Tests must be made at both ends of the unit alternately and weights added or subtracted until perfect balance is reached.

### Experience

Described herein is only the simplest form of unbalance. There are complications which may cause considerable trouble. In general, however, no matter how badly unbalanced a rotor may be, no matter if it is heavy on one side at one end and heavy on some other side at the other end, no matter if it has several heavy spots in it, it can be balanced by the addition of only two weights of the proper size placed in the proper places. As found, the unit at Big Creek No. 8 had a vibration of about 0.035 in. at the lower guide bearing and about 0.005 in. at the upper guide bearing. As left, after adding two large weights about 125 lb. each, one on one side at the upper end of the rotor and one on the opposite side at the lower end, together with two or three small weights, the vibration was cut down to considerably less than 0.001 in. at each end. As this was the first job and was rather difficult and, as none of staff had ever seen the balancing equipment before, it took a good many more trials than would be necessary now that experience has been gained with the balancing problem. The unit has been running quite satisfactorily ever since.

### Adding Weight

The case of the unit at Kern River No. 3 was particularly interesting because of the difficulty in adding weight to the turbine runner. This was done by casting a lead weight in one side of the cone on the bottom of the runner. Due to the fact that this cone could not be taken out through the manhole in the draft tube, the work had to be done inside the draft tube. The effective radius at which this weight was placed was about 10 in.

As found, there was a vibration of about 0.003 in. at the turbine bearing. Fortunately the first estimate of the angle of lag was correct and the first weight added was of such size that, after the second run, it was possible to calculate rather closely the size of the weight to give the proper balance. On the fourth run the vibration had been reduced to considerably less than 0.001 in. which was considered satisfactory. The unit also has been running satisfactorily ever since.

Since these units were balanced, the balancing equipment has been successfully used on several large synchronous condensers and on a large steam turbo-generator at the Long Beach Steam Plant of the Edison Co. It is now general practice to test all large units after overhaul with the balancing equipment before finally returning them to service. With this equipment it is quite easy to distinguish between dynamic unbalance and electrical vibration. The electrical vibration shows as a high frequency wave superimposed on the generally elliptical figure caused by unbalance.

# Field Inspection Practices In Turbine Maintenance*

## Proper Inspection Program Will Arrest Corrosion, Decrease Wear and Guide Operations to Obtain Minimum Maintenance and Maximum Life. Field Balancing Technique Described

By JOHN M. DODDS
Engineering Dept., General Electric Co.,
San Francisco, Calif.

MAINTENANCE is protection against wear, fracture, fatigue and crystallization, corrosion and erosion, and foreign substances. While the operator does not have much, if any, control over design elements such as the factors of fatigue and crystallization, together the designer and operator can control wear, corrosion and erosion, and foreign substances. This discussion will touch upon extraordinary, rather than ordinary, operating procedures which, in the last analysis, are directed towards maintenance. Extraordinary procedures might be classified under inspections, bolting, corrosion and erosion, insulations, shutdown (both long and short time) and balancing.

### Inspection

How frequently shall a turbine be opened up for inspection? There are many factors and differences of opinion. Some of the marine units coming into this port open up every eight months. This, however, is effected by the periodical general ship overhaul. Other engineers believe that every two years is adequate. Many steam turbines have run for a great many years without ever being opened up. Good general practice would dictate that a new unit should be opened up after not more than one year of operation to discover dangerous trends and first signs of insidious damage. If opened up a second time at the end of the following year and no signs of progressing damage are evidenced, it seems reasonable to believe that considerably more than one year might be allowed to go by without again opening up. On the other hand, if any signs of progressing damage are evidenced, corrective measures should be taken in the operating procedure and the following year another inspection made to determine the results.

Close examination of the buckets and nozzles should be made for the start of corrosion or erosion, cracks, scars or any surface changes; also for rubbing. Any unusual surface changes on the wheels and other internal parts should be examined looking towards determination of their cause. Cracks start usually at points of concentrated stress and if there is any suspicion of cracks they can be brought out readily by coating the wheel with kerosene, allowing it to soak into any possible cracks and then after wiping it off very carefully paint the wheel with a mixture of chalk and water. Any cracks evident will show by moistening of the chalk from the kerosene in the cracks.

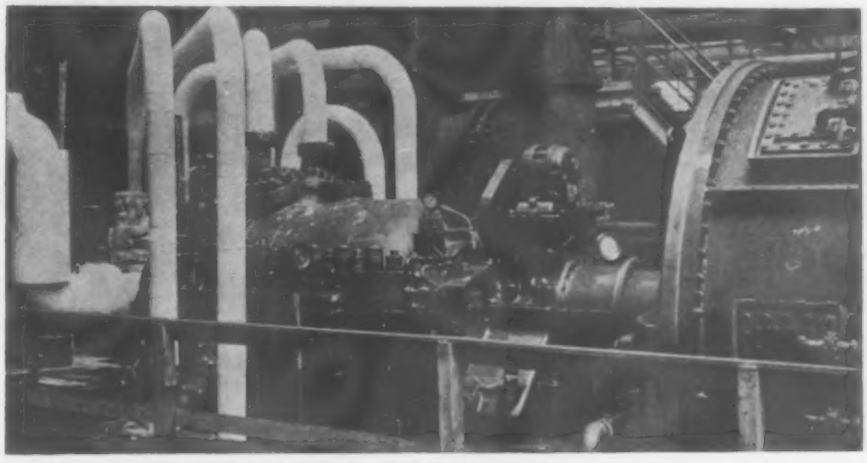
Wearing or rubbing of the packing should be examined for cause, also the condition of the springs and other accessories of the packing. If vibration has been experienced, the shaft should be checked for true. Needless to say, the bearings and journals should be examined for any corrosion, erosion or wear.

### Bolting and Unbolting

Management and procedure of bolting and unbolting the joints of turbines is worthy of consideration. The joint is a smooth surface straight to a true plane spotted in with a surface plate. When pulled up tight it should be steam tight without the necessity of any gaskets or compounds. On larger turbines, particularly the higher pressure and temperature units, it is unnecessary to use any kind of gasket compound or material in the joints. On smaller units, it is usually customary to paint the joint with some heat-resisting compound to fill up the small microscopic openings in the surface. Bolting must necessarily be brought up so that it is a great deal tighter than would be necessary to support the lifting effect of the pressure in the shell. This means a heavy pre-load on the bolts. Flange design is such as to bring the bolts as close to the center line of the turbine as is possible without allowing them to actually enter the casing. This is accomplished by making the bolts very long and the flanges very thick. In other words, the flange width can extend out from the center line as far as is reasonable from the bolt giving the bolt a leverage to close the joint at the inside edge.

It is good practice to stretch the bolts 1 mil per in. of length. Using a thermal coefficient of expansion of $65 \times 10^{-7}$, a simple calculation shows that approximately 175 deg. of temperature difference in cooling would give this bolt stretch. On large turbines it is quite common practice to drill a $\frac{5}{8}$ in. or $\frac{3}{4}$ in. hole through the center of the bolt through which a flame from a torch can be directed to bring the temperature of the bolt up while it is in place on the turbine. Before applying the heat, the nut is brought up a little better than hand tight and then heat is applied until the bolt head at the bottom has dropped down one mil per in. of flange thickness so that if we had a flange of

Typical turbine of the smaller size. Steam-tight machine fits on casing sections are dependent upon proper bolting during assembly, the technique of which is described in this article



*Report presented before Operating Economics Section, Pacific Coast Electrical Association.

Davey vibrometer equipment used to determine the amplitude and nature of vibration on large rotating bodies. Operating on the seismograph principle, the vibrometer is arranged to reflect a white light beam on the ground glass screen (right) tracing the machine's vibration to a highly magnified scale. By stroboscopic methods, using the neon hand-lamp (left) and circuit interrupter (center) the "high spot" of a rotor can be determined by a second beam of light from a neon source also reflected on the screen

able or on a rigid bracket provided for the test) in such a way that the motion of the white light will register the vibration of the unit perpendicular to the center line of its shaft. With the generator running at normal speed, the white light will trace a figure on the screen the horizontal length of which will represent the amplitude of vibration perpendicular to the shaft. The vertical width of the figure will represent the vertical vibration. This figure may take many different forms depending on the peculiarities of the vibration of the unit being tested. The general form of the figure will usually be an ellipse.

### Finding the High Spot

The red spot on the screen made by the light of the neon lamp will move around this figure in one direction or the other, depending on whether the light is interrupted oftener or less often than once each revolution of the unit. If the red light is interrupted exactly once each revolution of the unit, it will stand still at some point on the figure and appear as a red dot at some point on the curve being traced by the beam of white light.

Therefore, if the interrupter is adjusted so that the red spot is stopped at the extreme outside of the figure (away from the shaft) and, by means of the hand lamp, the number on the shaft appearing exactly on the same side of the unit where the vibrometer is located, is read, this number will be on the side of the rotor which is swinging farthest out from the axis of rotation. This side of the rotor is called the "high side" or "high spot."

Knowing the speed and size of the unit being tested, the "angle of lag" can be estimated, or it can be determined by making several observations at different speeds or by observing the motion of the red dot as the unit is allowed to slow down. Details of the latter methods are too long for discussion here.

Having determined the "high spot" and estimated the "angle of lag," the next stop is to add a weight opposite to what seems to be the heavy side of the rotor. The value of this weight must be estimated for the first trial. After this weight is added another run is made to find out what has been accomplished. If the "angle of lag" has been correctly estimated or calculated, the "high spot" will remain the same. It will be 180 deg. from the original "high spot" if the "angle of lag" is correct and the weight added is too large to just balance the heavy side. If the "high spot" moves against the rotation of the unit, the estimated "angle of lag" is too large and vice versa.

Two or three trials make it comparatively easy to estimate the location and weight to be added. Tests must be made at both ends of the unit alternately and weights added or subtracted until perfect balance is reached.

### Experience

Described herein is only the simplest form of unbalance. There are complications which may cause considerable trouble. In general, however, no matter how badly unbalanced a rotor may be, no matter if it is heavy on one side at one end and heavy on some other side at the other end, no matter if it has several heavy spots in it, it can be balanced by the addition of only two weights of the proper size placed in the proper places. As found, the unit at Big Creek No. 8 had a vibration of about 0.035 in. at the lower guide bearing and about 0.005 in. at the upper guide bearing. As left, after adding two large weights about 125 lb. each, one on one side at the upper end of the rotor and one on the opposite side at the lower end, together with two or three small weights, the vibration was cut down to considerably less than 0.001 in. at each end. As this was the first job and was rather difficult and, as none of staff had ever seen the balancing equipment before, it took a good many more trials than would be necessary now that experience has been gained with the balancing problem. The unit has been running quite satisfactorily ever since.

### Adding Weight

The case of the unit at Kern River No. 3 was particularly interesting because of the difficulty in adding weight to the turbine runner. This was done by casting a lead weight in one side of the cone on the bottom of the runner. Due to the fact that this cone could not be taken out through the manhole in the draft tube, the work had to be done inside the draft tube. The effective radius at which this weight was placed was about 10 in.

As found, there was a vibration of about 0.003 in. at the turbine bearing. Fortunately the first estimate of the angle of lag was correct and the first weight added was of such size that, after the second run, it was possible to calculate rather closely the size of the weight to give the proper balance. On the fourth run the vibration had been reduced to considerably less than 0.001 in. which was considered satisfactory. The unit also has been running satisfactorily ever since.

Since these units were balanced, the balancing equipment has been successfully used on several large synchronous condensers and on a large steam turbo-generator at the Long Beach Steam Plant of the Edison Co. It is now general practice to test all large units after overhaul with the balancing equipment before finally returning them to service. With this equipment it is quite easy to distinguish between dynamic unbalance and electrical vibration. The electrical vibration shows as a high frequency wave superimposed on the generally elliptical figure caused by unbalance.

# Field Inspection Practices In Turbine Maintenance*

## Proper Inspection Program Will Arrest Corrosion, Decrease Wear and Guide Operations to Obtain Minimum Maintenance and Maximum Life. Field Balancing Technique Described

By JOHN M. DODDS
Engineering Dept., General Electric Co., San Francisco, Calif.

MAINTENANCE is protection against wear, fracture, fatigue and crystallization, corrosion and erosion, and foreign substances. While the operator does not have much, if any, control over design elements such as the factors of fatigue and crystallization, together the designer and operator can control wear, corrosion and erosion, and foreign substances. This discussion will touch upon extraordinary, rather than ordinary, operating procedures which, in the last analysis, are directed towards maintenance. Extraordinary procedures might be classified under inspections, bolting, corrosion and erosion, insulations, shutdown (both long and short time) and balancing.

### Inspection

How frequently shall a turbine be opened up for inspection? There are many factors and differences of opinion. Some of the marine units coming into this port open up every eight months. This, however, is effected by the periodical general ship overhaul. Other engineers believe that every two years is adequate. Many steam turbines have run for a great many years without ever being opened up. Good general practice would dictate that a new unit should be opened up after not more than one year of operation to discover dangerous trends and first signs of insidious damage. If opened up a second time at the end of the following year and no signs of progressing damage are evidenced, it seems reasonable to believe that considerably more than one year might be allowed to go by without again opening up. On the other hand, if any signs of progressing damage are evidenced, corrective measures should be taken in the operating procedure and the following year another inspection made to determine the results.

Close examination of the buckets and nozzles should be made for the start of corrosion or erosion, cracks, scars or any surface changes; also for rubbing. Any unusual surface changes on the wheels and other internal parts should be examined looking towards determination of their cause. Cracks start usually at points of concentrated stress and if there is any suspicion of cracks they can be brought out readily by coating the wheel with kerosene, allowing it to soak into any possible cracks and then after wiping it off very carefully paint the wheel with a mixture of chalk and water. Any cracks evident will show by moistening of the chalk from the kerosene in the cracks.

Wearing or rubbing of the packing should be examined for cause, also the condition of the springs and other accessories of the packing. If vibration has been experienced, the shaft should be checked for true. Needless to say, the bearings and journals should be examined for any corrosion, erosion or wear.

### Bolting and Unbolting

Management and procedure of bolting and unbolting the joints of turbines is worthy of consideration. The joint is a smooth surface straight to a true plane spotted in with a surface plate. When pulled up tight it should be steam tight without the necessity of any gaskets or compounds. On larger turbines, particularly the higher pressure and temperature units, it is unnecessary to use any kind of gasket compound or material in the joints. On smaller units, it is usually customary to paint the joint with some heat-resisting compound to fill up the small microscopic openings in the surface. Bolting must necessarily be brought up so that it is a great deal tighter than would be necessary to support the lifting effect of the pressure in the shell. This means a heavy pre-load on the bolts. Flange design is such as to bring the bolts as close to the center line of the turbine as is possible without allowing them to actually enter the casing. This is accomplished by making the bolts very long and the flanges very thick. In other words, the flange width can extend out from the center line as far as is reasonable from the bolt giving the bolt a leverage to close the joint at the inside edge.

It is good practice to stretch the bolts 1 mil per in. of length. Using a thermal coefficient of expansion of $65 \times 10^{-7}$, a simple calculation shows that approximately 175 deg. of temperature difference in cooling would give this bolt stretch. On large turbines it is quite common practice to drill a $\frac{5}{8}$ in. or $\frac{3}{4}$ in. hole through the center of the bolt through which a flame from a torch can be directed to bring the temperature of the bolt up while it is in place on the turbine. Before applying the heat, the nut is brought up a little better than hand tight and then heat is applied until the bolt head at the bottom has dropped down one mil per in. of flange thickness so that if we had a flange of

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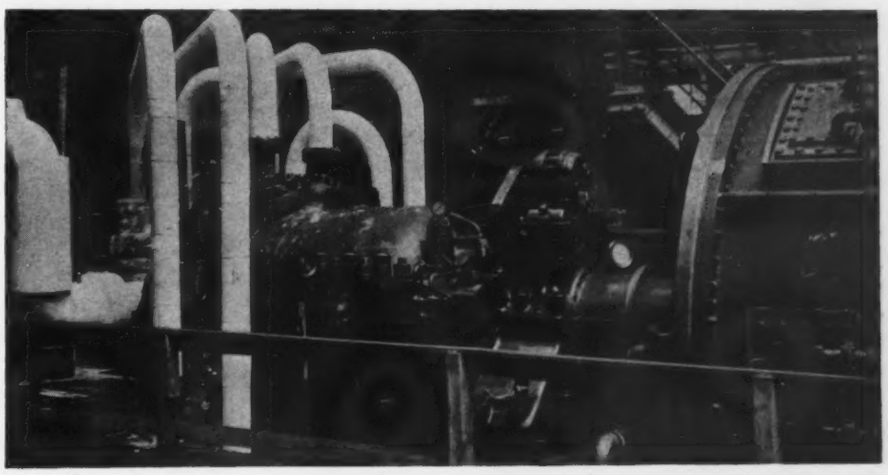

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20 in., heat would be applied to give a 20-mil gap between the head and the flange. Then, while the bolt is hot, the nut is brought up a little bit better than hand tight with a wrench and the job is completed.

As a matter of interest, 100 deg. change in temperature will give a stretch of about 7 mil per foot. Assuming Youngs' Modulous of $3 \times 10^7$, each degree change of temperature gives a pre-load of approximately 95 lb. per sq. in. in the bolt. For 1 mil per in. stretch and temperature change of 175 deg. F., this gives a pre-load stress of 16,600 lb. per sq. in. in the bolt. This, of course, will be reduced somewhat by compression of the flange and any give that might occur in the joint. It is usually a good idea to pull down every third bolt with a wrench to remove any possibility of further give in the joint before preloading the bolts.

All of this would indicate that the bolts for a steam turbine must be made of the very best possible steel looking towards a high tensile strength, but more particularly towards a minimum of creep or permanent stretch with high temperatures. It has been found that these two requirements are not consistent with each other, and that by sacrificing somewhat on cold tensile strength, it is possible to improve materially the hot creep effect. In other words, better characteristics are obtained at high temperatures. The heat treatment for this condition is special and becomes an important part of turbine design.

Bolts which have been set up for a year or so, particularly near the high temperature end of the turbine, usually will be found to be very difficult to start, removal of the nuts requiring some sledging on a short wrench. It is not at all infrequent to find them impossible to move, making it necessary to burn the nut off with a torch. This can be done without spoiling the bolt.

This brings up the desirability of a preparation on the threads of the bolt when it is first put together to prevent the rusting together of nut and bolt later on. It is good practice to apply a mixture of flaked graphite and water to the threads before putting the nut in place. The water is considered to be better than a light or heavy oil owing to the fact that the oil later on carbonizes to a flint-like carbon materially reducing the value of the graphite.

A simple calculation shows the impracticability of using wrenches to preload the bolts on very large turbines. Probably the 2½-in. bolt size is as large as can be properly tightened up with a wrench. Assuming 13 threads and an efficiency factor of 25 per cent, it is possible to apply a 15,000 lb. per square in. stress in the bolt by applying 100 lb. of force at the end of a 3-ft. wrench. Larger bolts have a larger cross-sectional area and usually have fewer threads per inch, so that with a wrench it might be difficult to get as much as 5,000 or 7,000 lb. per sq. in. stress on the steel, which, of course, is not adequate.

## Corrosion

There are three sources of corrosion in which we as engineers are interested. (1) That corrosion or flaking off of metal which takes place at high temperatures in the open air, or underneath lagging, or thermal insulation. This corrosion takes place at temperatures over 500 or 600 deg. F. and is a direct oxidization or direct chemical action forming the reddish-brown ferric hydro-oxide or rust. There seems to be no protection against this kind of corrosion except to keep the air away from the surfaces, or to use an alloy of chromium or nickel so that the products of the corrosion form a self-protecting coat. Even this protection is of little or no value when the temperatures go above 1,000 or 1,200 deg. F. Keeping out the free oxygen is really the most satisfactory protection.

(2) There is the direct corrosive action which hot steam has on the ferreous metal. High temperature steam at over 900 or 1,000 deg. F. appears to have a certain amount of dissociated hydrogen and oxygen in it and the oxygen combines directly with the iron forming the black magnetic oxide of iron $Fe_3O_4$. To some extent this corrosive action takes place at lower temperatures which accounts for the blackish appearance of the insides of steam pipes and other surfaces. This process seems to be to some extent self-protective in that after the layer of magnetic oxide reaches a certain thickness the process does not continue on at nearly such a high rate. Thus this type of corrosion does not become a predominating factor in our maintenance program. This is fortunate as there would seem to be no protection against this, other than the almost prohibitive cost of alloy steel with a very high percentage of chromium and nickel.

(3) There is that type of corrosion which takes place with ferric metals, either submerged or with various degrees of moisture. Metals in the open air corrode largely due to the moisture in the air. The corrosion proceeds on the basis of two chemical reactions, the first being the formation of ferrous hydro-oxide, a black or greenish material which adheres very well to the metal. This rapidly absorbs more moisture and combines with more oxygen to form a brownish reddish rust of ferric hydro-oxide.

It seems to be the well established opinion of authorities that at normal temperatures and in the absence of any moisture, corrosion will not take place on ferreous metals. Also it is definitely shown that oxygen is necessary with the moisture and that in neutral or slightly basic waters, the rate of corrosion is directly proportional to the oxygen content.

The reason why certain stainless steels or chromium and nickel alloys of iron resist corrosion to the extent that they do is because the substance formed by the process of corrosion forms a protective film. In some cases this film is invisible and unbelievably thin. If broken it is self-healing. In this connection it is interesting to note that velocity or rate of corrosion is somewhat inhibited by the film of corrosion products and that, when the medium in which the metal exists is moving across the surface of the metal at a high velocity and removes the product of corrosion, the rate of corrosion increases rapidly. Thus we have the high rate of corrosion in nozzles and buckets through which the medium is moving at a high velocity.

In view of the importance of the necessity of oxygen in the moisture to permit corrosion, it is clear why so much importance is attached to the deaeration of the water of a steam plant. It is found that heating the water to within 10 deg. of its boiling point will drive off nearly all the dissolved oxygen or dissolved other gases. This is true regardless of the pressure

On the inside of steam turbines it appears that very little can be done except in the selection of metals to inhibit the progress of corrosion, but fortunately this process does not proceed rapidly while the turbine is in operation as there is little chance for air or moisture in the turbine in the high pressure end and in the low pressure end the moisture should be practically oxygen free. The importance here is associated with the deaeration of the feed water so that no oxygen gets into the boiler and passes over with the steam to the turbine. It is safe to conclude that if proper steps are taken to prevent corrosion in the boiler and steam generation auxiliaries that the turbine end is protected as well as possible except in the case of a shutdown.

Erosion and corrosion are very closely related. Speller, a noted eastern authority, definitely makes the statement that erosion cannot take place without corrosion first in the case of gaseous flow. Based on this, it is safe to make the statement that, in the presence of clean, pure, dry steam there should be no erosion on steel buckets of the steam turbine in the high pressure end. From this follows the conclusion that in the low pressure end where moisture exists the use of stainless steels or corrosion inhibiting materials should prevent erosion or wear on the buckets. The author does not entirely concur in this conclusion. In larger units modern practice is to silver-solder a stellite shield to the leading edge of the low pressure turbine buckets to better withstand the erosive effect of the entrained moisture in the steam. Designs invariably are made to throw off as much moisture from the buckets to the casing and drain to the condenser as possible in each stage.

The modern theory of erosion is that corrosion takes place and the products of corrosion, being less adherent than the parent metal are washed or rubbed off by the medium. However it is believed that turbulent flow is a contributing factor. Experience indicates that the minutest scratches or surface flaws of metal are the starting points of erosion. Polished buckets will stand up against erosion much better than rough ones.

To inhibit erosion and corrosion on the interior of a turbine, one firm was known to pass a gallon and a half of paraffine oil through the unit weekly with the live steam and to run kerosene through just before shutdown to wash out the excess deposits. Again the author does not subscribe to this procedure at this time. Another firm blows a light lubricating oil through the turbine with compressed air when it is shut down. Keeping vacuum up after shut down, long enough to dry out the interior is very important.

Procedure for an extended shutdown when dismantling and inspection of the interior parts are not contemplated might be worthy of discussion. One source has recommended that a compressed air line be connected to the steam inlet side and a preheated blast of air circulated through the turbine to keep it at a uniform temperature of about 100 deg. F., during a shutdown period. Of course, this should be associated with cutting off of all possible leaks of steam both on the admission and exhaust side, and draining all parts so that there will be no possibility of moisture getting into the turbine. Other suggestions have been to install a fan to circulate air inside of the exhaust hood of the turbine and possibly to install steam or electric heaters. Another method would be to put the fans in the exhaust hood together with wooden trays of unslacked lime to absorb any moisture that might leak in. The hot air method with a small motor driven blower and steam heater or electric heater appears to have some merit. In general, it might be remembered that moisture will not condense on the surface of metal if the surface is kept at a temperature of only a few degrees above the surrounding air temperature.

### Cylinder Insulation

Under the subject of insulation of the cylinder of the turbine, much has been recently learned since going to the higher temperatures. For temperatures above 750 deg., asbestos does not seem to hold up as well as desired, and the use of glass or rock wool has been resorted to. This is put up in the form of bunches in bags made of asbestos which is re-enforced with monel metal wire. Galvanized or other forms of iron wire have not been successful at these higher temperatures as they soon get brittle and break. Below this temperature asbestos seems to be perfectly all right. Asbestos with less than 10 per cent water of crystallization marketed under name of Amosite is recommended by its manufacturers up to 900 deg. F. In some cases, a plastic lagging has been applied with magnesium blocks on the outside. In any event, the insulation should be protected by an iron hood or cover and in all cases the design of the lagging should be such as to make it easily removable so that when a turbine is opened up too much damage will not be done.

### Balancing in the Field

Balancing of the steam turbine, as a procedure and under the subject of general maintenance, fortunately does not happen to be encountered very frequently.

Needless to say, the recommended procedure is to dismantle the turbine, remove the rotor and send it to an Akimoff or other type of dynamic balancing machine. This, however, is a very expensive procedure in both labor and shutdown time, and there has long been the need of a really satisfactory balancing method by which the machine could be balanced in its own bearings.

The need of balancing a machine in its own bearings has been imperative since the larger units have been designed owing to the fact that the balancing machines are not built large enough to carry the weight of these rotors which sometimes exceed 100 tons. This might apply to the field of the generator more than to the turbine. The Thearle method with its associated instruments has been found to be very satisfactory.

It is based on the assumption that dynamic balancing may be accomplished with a rotating cylinder by adding two weights in two different radial planes and at an angle to each other. Each weight has its own effect on both bearings.

Bearing vibration may be both horizontal and vertical, one more than the other, and it is assumed that reducing

Dynamic balancing in the field has been greatly simplified by an electro-mechanical system which enables rapid calculations of the amount and point of unbalance, thus eliminating the laborious "cut-and-try" methods formerly used

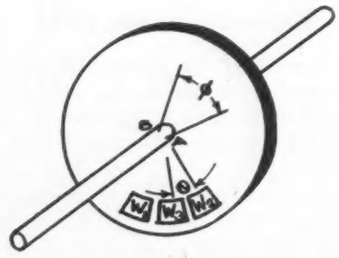


Fig. 1—Diagramatic representation of the method of determining the amount of weight necessary to compensate for rotor unbalance. Location is determined as shown in Fig. 2.

the greatest of these vibrations to zero will also reduce the other to zero.

In order to understand the basis of the Thearle** method, let us consider a rotating disc, the axial length of which is so short as to make a dynamic couple improbable. Such a disc is illustrated by Fig. 1.

If this disc is unbalanced by an assumed weight $W_1$, it will cause the disc and shaft to run out of true due to the forces and the give or spring of the shaft and bearings. If the point at which it throws out is considered to be at the point A on the shaft and is so marked, and if the degree of throw out or the magnitude of vibration is considered as being measurable in any selected unit, it is possible to express this vibration as a vector such as the line OA on Fig. 2.

The line OA represents this unbalanced condition, the length of the line indicating the amplitude of the unbalance or throw out, and the direction of the line indicating the point of throw out.

If another weight $W_2$ is added to the rotor, the amount of vibration and the point of throw out will be different. Let this relationship be expressed as the line OB. The vibration then is somewhat less and at a different angle $\phi$ to the original point of throw out.

Obviously, the line AB, both in direction and magnitude, indicates the effect of the added weight $W_2$. It represents the effect on the system produced by the additional weight and has moved the point of unbalance through the angle $\phi$ and changed its magnitude in accordance with the relative length of these two lines. Call it the *effect* vector of the system. Then, to endeavor to make this effect vector equal but

Fig. 2—Vector representation of the forces causing vibration when a trial weight is added at some angle radially from the original point of unbalance

opposite to the vector OA, it would be necessary to change the trial weight by the angle $\phi$ and in magnitude by the ratio of the length of OA to OB. If this is done, it will be found that the vibration vector has been reduced to zero and that the system now runs without vibration.

Without going through the vector algebra necessary to show the following results, let it suffice to say that with a revolving cylinder in which a dynamic couple is likely to occur, this same method of analysis will arrive at the selection and position of the weight.

Three runs of the machine would be necessary; first, a run without any added weights at all in which the point

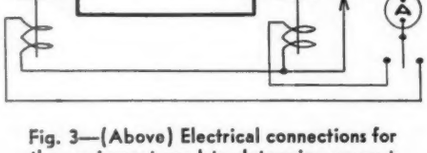
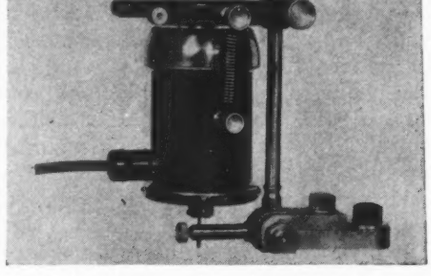



Fig. 3—(Above) Electrical connections for the equipment used to determine amount and location of unbalance. Below—one of the coils supported on the turbine bearings to convert mechanical vibration into electrical impulses



of maximum throw out of the shaft or bearings is measured and the amplitude of the vibration. This observation is taken on both ends of the rotor or on both bearings. A second run is taken with some reasonable weight added to one end of the machine and the same sets of observations taken at both ends. Then a third run is made with any other reasonable weight added at the other end and the same set of observations taken, the position and magnitude of the weights being measured and known. This gives data for the vectorial solution of the amount and location of the final weights. When this has been added, a fourth check will indicate, in most cases, smooth running results. Obviously, the equipment to measure the magnitude of the vibration of the bearing and the point of throw out of the shaft are the important elements of such a system.

If a heavy, permanently-magnetized field is spring supported to each bearing to measure either the vertical or the horizontal vibration and, in the air gap of this magnet, a coil of light construction rigidly fastened to the bearing is placed, the motion of the bearing will be transmitted to the coil and become relative motion between the coil and the magnet, thereby setting up voltages in the coil which are proportional to the magnitude of vibration. The voltage will be alternating and to all practical purposes a true sine wave.

A suitable micro-ammeter of the direct current type, together with a commutator to be described later, are connected together in accordance with the connection shown in Fig. 3.

The commutator will consist of a brush connected by a suitable flexible shafting to the turbine rotating on the inside of a commutator, consisting of a 180 deg. contact segment and 180 deg. insulated segment so that as the brush travels around, it is in contact for one-half turn and is open circuit for one-half turn. Contact to the brush is made through a slip ring. Thus the circuit is opened and closed through this commutator at a speed equal to the revolutions per minute of the machine. This circuit is connected in series with the vibration indicator and the micro-ammeter.

To read the magnitude of the vibration, the commutator is turned by hand until the reading of the micro-ammeter becomes a maximum; inasmuch as the commutator will cut off one-half of every sine wave, turning of the commutator to a maximum reading means that the brush makes contact with the segment at the beginning of a loop of the wave and breaks contact at the end of the same loop so that only an intermittent direct current will be imposed on the ammeter. The reading of the meter indicates the relative amplitude of the vibration.

To read the point of maximum throw out, the commutator is again turned until the ammeter reads zero. This means that the circuit is made at the positive maximum of the sine wave and is broken at the negative maximum of the sine wave so that a voltage is impressed on the micro-ammeter as much positive as negative reducing the indication of the meter to zero. The angular position of the commutator at this point is taken to be the point of maximum throw out because it is at this point that a minimum voltage is generated in the moving coil which means that it is at the extreme end of its travel. These readings specify or define a vector for their individual bearings.

** This discussion of Dynamic Balancing in the field is briefed from a paper by E. L. Thearle, Transactions of the A. S. M. E.—October, 1934.

# Rigid Conduit vs. Cable for Customers' Services*

By CARL C. MAK
Pacific Gas and Electric Co.

THE subject to be discussed, materials and arrangements for customers' services, lends itself into two topics, the first being the economy and the adaptability of sundry types of service entrances and the second, the theft problem. In the minds of many utility people the topic should be reversed, but we still adhere to the old adage that the majority hope to be honest.

With the introduction by the various electrical manufacturers of the so called "service entrance cables" the industry has become interested as to what changes this will make in our conventional methods of house wiring. Coupled with this is the comparatively new socket-type meter which adapts itself admirably with this cable, both in simplicity and economy, plus being comparatively theft proof as will later be discussed.

Before discussing advantages and disadvantages of rigid conduit versus cable, let it be said that it gives a new angle of attack on adding new load to already wired homes, being particularly true in the rural sections where the bulk of major appliances such as ranges and water heaters are being sold. There is no intent to transgress into the field covered by the sales people, but when new developments are made available which tend to lessen the cost or break-down in the customer's mind that the appliances which he installs will not cost a fortune to wire for them, it is a good thing for the industry as a whole. To further exemplify this, the sale of a heavy duty appliance usually requires renewing of the service which changes this sale into a double selling job, one the appliance, and the other, wiring. Undoubtedly, regardless of any other merits this cable has to a degree lessened sales resistance.

With this sidelight out of the way, consider and analyze these facts: (1) There can be very little question that the use of rigid conduit on new homes where appearances play a part and in the metropolitan areas due to the ordinance requirements and Code prohibiting cable being run in concealed wall spaces, does fit the job to better advantage; (2) The small contractor may purchase conduit from his jobber in any amount from one length up, allowing him to order his material as needed without the necessity of carrying excessive stock; (3) Cable must be purchased from the distributor in lengths varying from 250 ft. in the smaller sizes down to 100 ft. in the larger, necessarily tying up much money. It is quite obvious that many of the smaller operators may have a rather slow turn over and would be faced with an unnecessary capital investment; (4) On a short service without bends or elbows, rigid is comparable to cable within a negligible amount; and (5) Scrap ends of cable are a complete loss, while on the other hand short pieces of conduit may be utilized in making nipples.

Now let us consider a few advantages which cable possesses:

(1) Because of its compactness and ease of attaching fittings and clamps, cut down labor cost of the initial installation, particularly where off-sets and bends are encountered; (2) Fittings are relatively inexpensive as compared to those of rigid conduit and fewer in number are required on a given installation; (3) Cable adapts itself exceedingly well with the socket type meter; (4) When used on specified jobs, a material saving may be effected; and (5) It gives the trade an alternate where rigid might not be feasible or is difficult to install.

As a summary, may it be stated briefly that each has its place. As for example, if you were building a new home, I doubt very much whether you would permit your electrical contractor to run flexible service cable on the outside of your newly stuccoed wall. On the other hand, if you happened to reside in the rural section and were faced with a relatively high cost for installing an electric range which you purchased, you would consider the use of cable, particularly as it affects your pocket book.

The diversion of energy has been a serious problem with utilities and its complete solution is as to expect Utopia. No matter how ingeniously an article is assembled, someone can, or will, devise a means of pilfering. All that can be hoped for is to discourage the amateur and place as many obstacles in the way of the professional as possible. The most suitable appurtenance for this problem is the socket-type meter, which, as its name implies, requires a special base installed in the service entrance in such a manner as to eliminate energy diversion by:

1. Pulling a fuse on a three-wire service.
2. The use of jumpers.
3. Tapping from behind the switch —and sundry means of tampering.

Others of a more cautious nature drill or cut the conduit and tap the service. Such cases are difficult to discover, particularly where the service runs through attics or wall spaces. Enough of the methods used. What is wanted is at least a partial solution.

Service entrance cables do have a number of attributes superior to conduit work, namely; the standard cables now on the market, speaking of 3-wire installations, use a bare stranded neutral concentrically wound around the two hot legs, and in addition to this a galvanized steel tape is added, also wound concentrically, but in the reverse direction. Without a doubt tapping a cable of this type would present a tricky problem to most operators.

Before concluding, let it be said that the use of rigid conduit versus cable is controversial, depending on application, and purpose for which used. But let it be stressed that service cable has in the rural areas been a valuable aid in consummating many sales otherwise not possible, and, after all, isn't the mission of all in the industry to furnish tools necessary to further the sale of electricity?

***In this P.C.E.A. Report, the controversy between rigid conduit and armored cable for customers' services is subjected to a logical analysis in which both sides of the question are given consideration. The author, on the meeting floor, asked for informal discussion by proposing the following questions:**

**1. To what extent is it necessary for the utilities under present conditions to change their standards to this (cable) method of installation?**

**2. What would be the reaction on the part of electrical contractors and the public?**

**3. What steps, if any, should be taken to make possible the acceptance of service cables in areas not prohibiting its use by ordinance?**

**The Editors open these columns for constructive discussion of this important subject.**

# Vacuum Tubes in Action

## VI—Thyratrons

By H. C. STANLEY
Asst. Engineer, General Electric Co.,
San Francisco, Calif.

IT SHOULD be noted that in the photo-electric devices described in the preceding chapters, the vacuum tubes employed are, in general, small tubes such as used in our radio receivers. For instance, the RCA 56, obtainable in any radio store for a few cents, can be used to amplify the few microamperes output from the phototube to the few milliamperes necessary to operate a sensitive relay. If the contacts of the sensitive relay are of insufficient capacity to operate the ultimate device, it is only necessary to interpose a small contactor whose coil can be energized through the contacts of the sensitive relay. In the case of the magic doors, which are coming more and more into use, the RCA 56 tube controls a sensitive relay, which in turn directly controls the coil of a small solenoid air-valve. This valve admits air to the door-operating air cylinder.

In many applications it is advantageous to substitute a gaseous tube for the sensitive relay. These tubes can be accurately controlled by potential applied to the grids and are to all intents and purposes, instantaneous in action. Furthermore, the maintenance of delicate contacts is eliminated.

Gaseous tubes, already referred to, are called thyratrons. A thyratron is an electronic tube of the hot-cathode, gas-discharge type. It has a filament or heater which raises the cathode to emitting temperature; or the filament itself may be the cathode. It also has one or more grids for controlling the starting or firing of the tube. After the tube once starts, the grid has no further control, as it can neither modulate, limit, nor extinguish the discharge under most normal conditions of operation.

Gaseous tubes similar to the thyratron, except for the absence of grids, are called phanotrons. Phanotrons are chiefly used as rectifiers, but they are also useful as one-way valves in circuits where it is desired to have the current flow in one way only.

### Other Nomenclature

Tubes having two electrodes are called diodes. Tubes having three electrodes are triodes. Tubes having four electrodes are called tetrodes, and tubes having five electrodes are called pentodes.

A kenotron is a high-vacuum two-electrode tube. It is a thermionic tube, on account of having a hot filament. The other electrode is the anode, or plate. Kenotrons are made in very high voltage ratings and are used as high voltage rectifiers for obtaining direct current for X-ray work, cable testing, smoke and dust precipitation.

A pliotron is a high-vacuum, thermionic tube having one or more grids. These tubes are usually of the small, low voltage class, and are used by the millions in radio receivers.

On account of being high-vacuum tubes the ampere capacity of kenotrons and pliotrons is limited, generally, to a few milliamperes.

A grid-glow tube is a cold-cathode, gas-discharge tube. This tube has one or more grids to control the starting of the flow of current. The cathode is not heated, and the initial electrons are drawn from the cold surface of the cathode by a sufficient voltage gradient.

A glow tube is a cold-cathode, gas-discharge tube in which no means is provided for controlling the current flow.

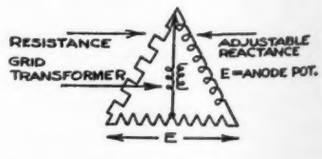
In an earlier chapter mention was made of mercury-pool tubes. The older type was started by tilting the tube so as to break a bridge of mercury between the cathode and starting anode, thus establishing a small arc which started the flow of electrons. In a later development the pool type tube is started by passing current through a small electrode permanently immersed in the pool of mercury. This tube is known as the ignitron.

The ignitron has become a very useful member in our family of electronic tubes. The fact that it can carry enormous currents for short intervals and that these currents can be accurately timed, makes the ignitron ideal for spot-welding purposes.

As explained in Chapter II* of this series, the passage of a small current through the starting electrode, sets up minute arcs which liberate electrons at the surface of the mercury pool. If the anode is positive in respect to the mercury pool the liberated electrons will shoot to the anode, and in passing through the intervening mercury vapor will ionize this vapor by knocking electrons off the mercury atoms. The presence of the positive ions as created by this process of ionization results in a low resistance path between cathode and anode so that a large current can flow. However, in the case of a.c. supply, the flow of current stops when the potential reverses, and no current flows during the negative half-cycle, during which time the mercury vapor becomes de-ionized, and therefore will not pass current when the positive wave again appears. This is a very important characteristic of the ignitron as it makes it necessary to fire it every cycle by means of the starting electrode. For instance if a temporary current is passed through the starting electrode at the beginning of the positive half-wave, the tube will carry current for one half cycle and then cease firing. This fact makes it a simple matter to determine the exact number of cyles that the tube will pass current.

This method of firing control also applies to the thyratron. It is only necessary to hold the potential of the control grid at a value sufficiently low to prevent passage of current over the positive half-wave for each cycle. If this value is exceeded the tube will pass current to the end of the half-cycle, leaving the grid in control at the start of the next cycle.

The output of thyratrons can be accurately controlled from zero to maximum current by varying the time at which the tube fires. The firing time can be delayed by shifting the phase of the grid potential. This is easily accomplished by an adjustable reactance in the grid circuit. Current will pass from the instant of firing to the end of the half-wave. When there is 180 deg. displacement between the grid potential and the anode potential, the grid is always negative when the anode is positive and no current will flow.

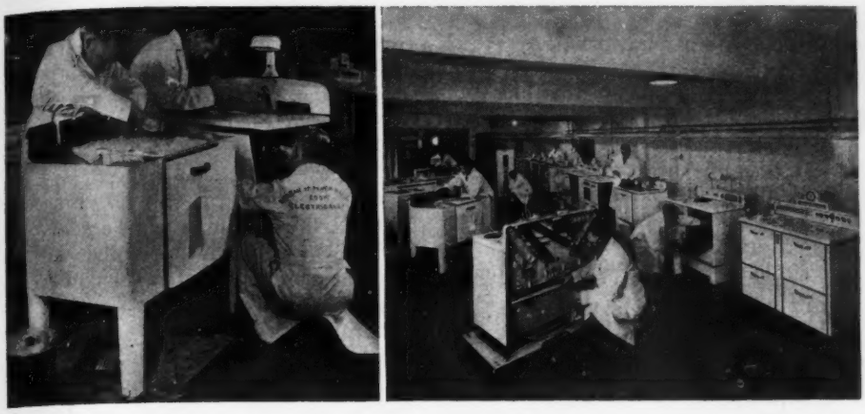



The accompanying sketch shows a resistance and reactance in series across the anode potential with the grid potential taken off at the junction.

When the reactance is low the grid potential swings in phase with the anode potential, and when the reactance is increased, the grid potential swings behind. This phase shift can also be controlled by variation of the resistance. This grid phase-shift is used to regulate the voltage of large iron tank rectifiers and to control the speed of motors and has numerous other applications.

# Cooperation on Parade

OUTSTANDING ACTIVITIES OF THE RECENT PAST AND FUTURE WHICH CONSTITUTE A SUMMARY OF COOPERATIVE MERCHANDISING IN THE WEST



When a range is received from a dealer the Bureau's test crew goes over every part of it thoroughly, checking every operating detail, giving the range a 3-hour test of all surface burners and of the oven against its thermostat, thus assuring delivery to the customer of a range in perfect condition for full satisfaction

## Los Angeles "Going To Town" With Ranges, Water Heaters

LOS ANGELES may have been slow to start in the electric range picture but there is no denying that now that it has started on a comprehensive scale some of the biggest news in range merchandising is expected from this region in the next few months. With over 500 range and water heaters sold last month and April showing an expectancy of about 700 more units, the electrical industry may well be said to be "going to town" on electric ranges in Los Angeles.

Two hundred dealers, 14 manufacturers and the aggressive Bureau of Power and Light are staging a range campaign featuring high grade models (of an average retail price of around $140) on terms of nothing down and $2.75 per month with the water or electric bill, financed under Electric Home and Farm Authority terms.

Every model offered has a large oven, four high speed surface elements and each has electric clock control. Makes featured are Crawford, Estate, General Electric, Hotpoint, Kelvinator, L & H, Marion, Monarch, Norge, Occidental, Stanford, Universal, Westinghouse and Woolwine.

How thoroughly the dealer and the manufacturer are backed up in the campaign by the cooperative assistance of the Bureau of Power and Light's Business Agents' Division can best be appreciated from a description of its test and delivery service to dealers, a feature which many utilities would find advantageous to adapt to their own systems.

### Where Dealers Need Help

Experience showed that dealers on the whole were inadequately equipped to make a satisfactory delivery and installation of the range to the customer. To make a satisfactory delivery takes about three men and first class equipment. In the past range dealers made a sale, delivered the range crated to the customer's premises, uncrated it in the garage or on the driveway, struggled to fasten the legs or cabinet base to the range, wrestled with it to place it in the kitchen where it was required, were lucky to get it in without chipping the enamel or otherwise damaging range or surrounding woodwork, sometimes found some defect overlooked by the manufacturer which required replacing the entire range or made necessary embarrassing repeated service calls and, in general, created a negative atmosphere around the new range.

Feeling that every new range user should be proud of her purchase and so enthusiastic about it that she would automatically advertise it to all her friends and neighbors, Chet Dye, manager, Domestic Appliance Section, developed the Bureau of Power and Light's present technique with the guidance and supervision of Burdette Moody, Arthur Elliott and others of the Business Agent's Division.

At 1347 Wright St. an unostentatious shed was converted into a test platform. Here all the preliminaries of examining the new range to see that it works properly in every respect and of preparing it for neat and efficient delivery are undertaken by the Bureau for the dealers.

### Test Before Delivery

A range sale now proceeds as follows. The dealer maintains only a floor sample stock. He does not need to warehouse ranges himself. When he makes the sale, sings the order, he notifies the Bureau of Power and Light and his wholesaler. The Bureau of Power and Light makes the arrangements for the free wiring through one of its contractors. The wholesaler delivers the new range, crated or uncrated, to the Bureau test platform. Here every inch of it is examined thoroughly. The enameled panels are checked for chips and breakages and if found defective replaced. Insulation is checked and the range equipped with a "pigtail" disconnect plug and lead. Then it is given a thorough running test; each element is tested, controls checked, and a 3-hour oven test run against a standard thermometer to check the operation of the thermostatic control. This also gives the range a chance to expand and contract and go through a normal operating cycle at 350 deg. Water heaters also receive a similar check up before delivery.

The approved range is then tagged, covered with a neat cover, loaded on an attractively painted truck and delivered to the residence by three strong and neat appearing delivery men. The range is moved quickly and easily into the kitchen, plugged into the already installed range outlet and the new owner given a brief instruction as to its operation and care. She is given an envelope containing pamphlets providing "information of importance to new electric range owners." A few days later one of the Bureau's home economists makes a call to see how she is getting along with her range and to assist her to get better results on any problem that has developed. This test platform is under the supervision of Jerry Allen, who likewise supervises the five delivery trucks making the home deliveries.

### Cooperating Salesmen

A second fundamental of the range cooperative program is the method of

compensating salesmen. The Bureau maintains a sales staff of 20 or more salesmen on civil service, receiving a $50 minimum salary for which they are expected to devote 3½ hours a day to Bureau activity. The remainder of their time is devoted to dealer sales. They collect a 10 per cent commission and a 2 per cent override for sales made through the dealers. Their work for the Bureau consists of a cold canvass survey of every home in their district. Although many were slow to see the advantage of this survey at first, the salesmen are coming to recognize it as one of the richest sources of prospects they have. Likewise, they are gradually making a canvass of the electric appliance use of every home in the city of Los Angeles. To date 10,000 homes have been surveyed and the results are being tabulated and correlated by A. C. Hall, a marketing analyst employed by the Bureau for this division.

Whereas dealers themselves only had a minimum number of salesmen last year they, too, are adding salesmen of their own as business has improved. This has necessitated a method of registering prospects so that the interests of either the dealer's own salesmen or the Bureau cooperative salesmen may be protected.

Every range salesman, both of dealers and of the Bureau, has been given a thorough schooling at the Bureau cooking school training class, conducted by John Stigeman. This sales training continues to be a feature in the program.

Mr. Dye feels that the single remaining weakness in the set-up, that of sales management of dealer salesmen, will eventually be worked out on a cooperative basis also.

Home economists' work also ties into the program. The Bureau's chief home economist, Mrs. Newton, is the executive over the group of home economists who work directly under the branch office sales staff. Constantly in consultation with her group of women Mrs. Newton, known as "Ann Martin," sets up a standard of practice which is followed by each of the individual home demonstrators in her work.

### Home Economist Follow-up

A complete kit is provided each individual home economist so that she need not want for anything when she goes to a home to make a range demonstration. She is equipped with a uniform smock of attractive pattern, with a complete kit of cooking utensils packed in an airplane luggage outfit which fits her car and is supplied with food and ingredients necessary to perform her job efficiently and without recourse to any of the housekeeper's own stock. Seven of these home economists work under the sales supervisors in the various districts.

Accounting procedure is synchronized by means of a teletype system, employing uniform accounting forms, between the test platform and main office. The Bureau at the present time is engaged in refunding former Los Angeles Gas & Electric Co. customers who wired for an electric range during the past several months since the election which gave the Bureau the right to purchase the private company's distributing system. Some 1,500 refund certificates have been made out.

Publicity and promotion of the range campaign employ both newspapers and radio. Large advertisements are run by the Bureau of Power and Light with tie-in ads by dealers and distributors of ranges in the daily papers.

Over the air a 13-week broadcast from 2 to 4 p. m. each Tuesday over KHJ has featured the electric kitchen and electric cooking. The broadcast, known as "House Party," is in the nature of a fun show and features Alphonse, a famous chef. Broadcasts are held from the Palomar, a large dance pavilion at Third and Vermont Sts., where a substantial audience of women can hear the broadcast.

Results of the campaign on range and water heater units indicate its success. During March 438 ranges and 102 water heaters were sold. During the first 15 days of April there had been sold 394 ranges and 101 water heaters and the rate of sales was increasing so that from 600 to 700 units were expected for the month. One significant feature of the type of ranges sold in the campaign is that each one of them is of such a luxury class as to create an excellent impression on the purchaser and to build up word-of-mouth publicity from pride of ownership. This is not true of the usual cheap campaign range.

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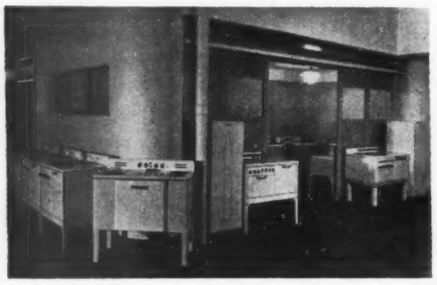
A KITCHEN PLANNING bureau has been established as a part of the Domestic Appliance Section of the Bureau of Power and Light, Los Angeles, with Louie A. Politowski, architect, in charge.



Like audition rooms to radio sales are these range and refrigerator rooms at May Co., Los Angeles. They provide a place where the salesman may talk to his prospect in semi-privacy without store distractions

Completely refinished when Boulder Dam power came to Los Angeles, the May Co. appliance floor reflects many novel ideas of Ben Platt, its manager. The large area is divided into many small spaces, all well lighted

One niche is this super-kitchen, with ceiling panel lighting, monel work surface and appliance tops, dishwasher and disposal unit. Here a trained saleswoman can take a few customers and demonstrate any appliance

## Bring Kitchen Clinics On Western Tour

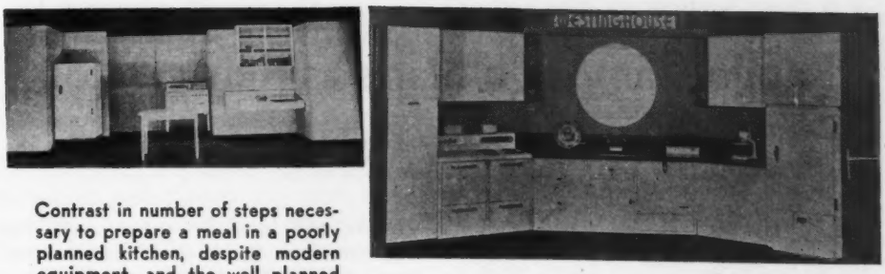
IRVING W. CLARK, manager, Kitchen Planning Section of Westinghouse, brought a pocket edition of the Westinghouse kitchen clinic to the West during the past month. Accompanied by Pearl Gray, head of the home economics department, and Joe E. Kelly, manager of range sales, Mr. Clark followed up the unique kitchen clinics and home economist conferences staged by Westinghouse at Mansfield with a field tour which began at Dallas with meetings for the trade and the public in Phoenix, San Diego, Los Angeles, Stockton, San Francisco and Oakland, Alameda, Portland, Seattle, Spokane, Boise and Salt Lake City.

Valuable feature of the meetings was that the ideas and suggestions developed by the leading home economists of the national women's magazines and large utilities during the kitchen clinic were turned over to the dealers and salesmen of the region to be used with their customers. In public meetings the kitchen planning story was dramatized in such a way that dealers can now follow up with effective selling during the succeeding months.

Program of the meetings usually consisted of an introductory talk by Mr. Kelly, detailing the phases of electric cooking from the first chicken cooked by electric heat in 1858, through the old Copeman range, predecessor to Westinghouse, and the Hathaway time and temperature control, to the present highly styled and completely refined automatic electric cooking machine.

Mr. Clark followed with an informative talk on the fundamentals of kitchen planning since the first test of the kitchen idea in 1934. Indicative of the interest in electric kitchens he told of the first test advertisement in Homes & Gardens in 1934 which brought such a big response that in 1935 the first product tie-in was made with the complete kitchen story. As a result of this second advertisement more response came for range sales than from any previous product advertisement on ranges alone. There were 3½ times as many kitchen planning requests returned enclosing 10 cents each for a book. That year the average sale resulting from inquiries thus received ran to $30 and a larger percentage of ranges was sold than before. Last year the average kitchen request eventually landed an average of $78.75 per inquiry received. There were 500,000 requests received last year and 700,000 are expected this year.

In a clever skit contrasting the average kitchen with modern equipment but poor arrangement with the well planned modern display kitchen, the difference in number of steps needed to prepare a meal is dramatized. Following the skit Mr. Clark concludes with an outline of what kitchen merchandising really is. To quote him, "it really means selling equipment in terms of the complete kitchen." To do this he suggests use of the kitchen plan in miniature which sells the idea of planning for the future. This plan has sold more ranges than product plans alone. It sells in terms of eventual service from the complete kitchen. The second item recommended to dealers is the display kitchen. It proves so effective in selling merchandise out of the display rather than alone from the floor.



Contrast in number of steps necessary to prepare a meal in a poorly planned kitchen, despite modern equipment, and the well planned all-electric kitchen was made from these two stage sets at the Westinghouse kitchen meetings

Mr. Clark also announced the new Westinghouse Institute at Mansfield, Ohio, which consists of 5,500 sq. ft. of floor space devoted to home service, kitchen planning and photographic work in kitchen and laundry planning. Kitchen planning service from this institute is available to the dealers of the line.

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## Roaster Campaign Starts in San Joaquin Valley

IN newspaper parlance "two stories broke" in the San Joaquin and Midland Counties territory last month. First was a new dealer newspaper titled *"The Retail Reporter,"* published by the merchandising division of San Joaquin Power as a means of keeping dealers and salesmen informed about promotional campaigns both of the utility and of appliance manufacturers. Second was another electric roaster campaign which will continue throughout the spring.

*The Retail Reporter* likewise has as its purpose that of keeping dealers and their salesmen informed of new appliances and equipment available, presenting ideas and means of improving sales presentation, suggestions for improved window and store displays, for newspaper and radio advertising, and information of business value about the industry locally or nationally. Through its columns it is hoped that dealers and their salesmen will be enabled to benefit more from the cooperative activities being carried on throughout these regions. The first issue appeared April 12 and contained a feature announcement of the roaster campaign which started April 15.

Public response to a roaster campaign last year proved so good that it is anticipated even better results will be had this year. It is pointed out that much of the pioneering has already been done, roaster owners are satisfied users and recommend them to friends, new model roasters are more attractive and have even more features than last year, and that manufacturers and utilities are cooperating to assist dealers to make more sales. Advertising for the campaign will include a series of 2-day demonstrations to be held in the various district offices of San Joaquin Power and Midland Counties. These take place afternoons only, from 1 to 5 o'clock, on a schedule which includes Selma, Dinuba, Merced, Los Banos, and Madera in April, and will be held in Corcoran May 4 and 5, Coalinga May 7 and 8, Santa Maria May 11 and 12, San Luis Obispo May 14 and 15, and Taft June 8 and 9. In Fresno and Bakersfield demonstrations will be held at dealers' stores rather than the utility offices. In Fresno the demonstrations will be from May 17 to June 5 and in Bakersfield from June 10 to June 26. Miss Alice Hetzel, veteran of last year's demonstration program, will conduct them this year also.

Advertising over four local radio stations in Merced, Fresno, Bakersfield and San Luis Obispo, supported by newspaper advertising and attractive window cards furnished to all dealers, will serve to publicize the campaign over a wide front.

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IRONER SCHOOLS are conducted each Monday evening at the Mary Dowd Reardon Studio, 3100 Telegraph Ave., Oakland, for Ironrite dealers and their salesmen and demonstrators. Likewise the classes are designed for any retail customers who may wish to take special instructions. In those cases in which the dealer is not equipped to give a home demonstration it is likewise valuable. Last year more than 500 people were taught in these weekly ironing schools.

# Range Campaign Starts as Refrigerators Carry On

WITH the spring refrigeration campaign well under way as a creator of selling momentum for a strong season throughout the summer, the next order of promotion in northern California is devoted to the electric ange. *"Go Modern—Go Electric With a 1937 Electric Range"* is the slogan under which a combined dealer and utility campaign is beginning, May 1. Special offers of a $15 discount to purchasers are made through a cooperative arrangement between dealers, the Pacific Gas and Electric Co., and manufacturers of Crawford-Graybar, General Electric, Estate, Hotpoint, Kelvinator, L & H, Monarch, Norge, Occidental, Standard and Westinghouse ranges.

The special discount offer, good from May 1 to 31, is made on ranges that sell for $139.50 and over, and are equipped with an automatic oven time control. Cost is borne by the dealer and manufacturer or distributor jointly, the dealer being rebated for half of the $15, which represents half of the cost of the automatic timer. This plan is instituted in order to stimulate the sale of the timer-equipped electric range. The timer is considered to be one of the most desirable features of electric ranges and so often is not sold with the range.

Newspaper advertising by P. G. and E. will support the campaign in 280 newspapers beginning May 10. The exact date of a local ad is determined in each locality by dealers, utility, and the newspaper. Announcements on the utility's radio program, billboards every where in the system, an essay contest in *P.G. and E. Progress*, bill stickers, and a colorful display card offered free to dealers will likewise be used in advertising and promotion.

### Canning and Cooking Schools

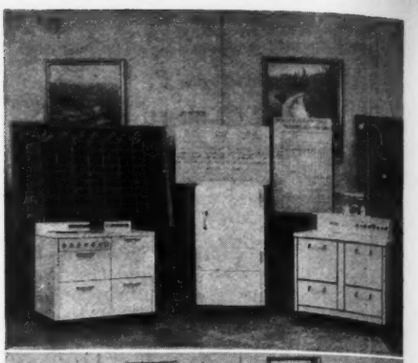
Something new in cooking schools will be staged as a buying stimulator. Through arrangements with the Ball Bros. Fruit Jar Co., Miss Lillian Brinkman, and with the Hotpoint Co., Miss Jane Cavanaugh, will conduct a series of oven canning and cooking schools in local woman's club, Legion Halls or other auditoriums in Fairfield, Rio Vista, Vacaville, Paradise, Red Bluff, Lakeport, Santa Rosa, Napa, Petaluma, and King City. Invitations to the public will be sent out in each instance. Dealers will be urged to make window displays to tie-in with the cooking schools, and local newspaper publicity will broadcast the news of this unusual service to homemakers.

Under the new commercial policy of P. G. and E. each division now exercises initiative as to its method of carrying out the general program of the month. Thus each division has plans of its own for particular range campaign activity and for dealer participation. In the refrigerator campaign the San Jose division under Jack Ross, carried on a most comprehensive program, including "live" refrigerator displays on the floors of all participating dealers' stores. Hostess programs were conducted under the direction of Miss Raymond, an energetic and enthusiastic home economist. (Plans are now under way in that division for a school for dealer salesman on some of the fundamental things about electricity they should know. It is to be conducted by Emmet Britton, dealer contact representative.)

In Sacramento division dealer meetings are to be held in Sacramento, Vacaville, Placerville, Rio Vista and Woodland, under direction of L. J. Brundage, division sales manager. Letters to all prospects will enclose manufacturers' literature and present the details of the present campaign offer—$15 special discount (to provide for the automatic timer) $15 wiring allowance, and a trade-in on old stove up to $20—a total saving at this time of about $50.

Shasta, DeSabla, and Colgate divisions have a tri-division salesman's campaign, with quotas set at 125 per cent of the established system quotas, each salesman competing against the salesman in the other division. This special contest began April 2, and runs to June 30. Drum division has announced no special campaign but expects to sell more than its quota of ranges. San Joaquin division will conduct a contest for salesmen, will hold dealer meetings and cooking schools.

East Bay division will have a campaign of its own and likewise have cooking classes for prospects and those new owners who have had beginner's difficulties that can be adjusted by more knowledge. Eureka division will stage dealer meetings and have special prizes for special attainment. San Francisco division had not yet developed its plans but was preparing to make special effort on electric ranges.



Top: Stage setting for the first range council at San Rafael. Points of benefit were checked on the blackbard at left. At extreme right is the range service board used to explain just what goes into the wiring job. Second picture: The San Rafael council meeting. Third picture: Santa Rosa council meeting. Fourth picture: Members of the Santa Rosa group don aprons and try a hand at cooking themselves—left, Cecil Halstead, store manager, L. A. Drake Co., Santa Rosa; center, B. H. Mitchell, Empire Electric Co., Santa Rosa; left, George Dickerson, Rex Hardware Co., Petaluma. Bottom picture: Cecil Halstead shows the primitive cooking methods of the past—at which he claimed to be adept if given a good camping trip

### North Bay Range Councils

It remained for Al Walker and the Bay division to exercise the most original initiative in preparation for this range campaign. First, to decide just what was best to be done, little individual meetings of one, two, never more than 15 dealers and salesmen were held by dealer representatives. To use Walker's words, "In these meetings we could both let our hair down and really get down to talking fundamentals." Out of this came the realization both by dealers and salesmen and the utility that the reason dealers sold few ranges was that they were unpepared to sell them effectively. The remedy for this was obvious.

So with dealer and manufacturer help, two series of six range and water heater councils, one series in San Rafael, the other in Santa Rosa, were organized.

Not to teach salesmanship but to bring out all of the selling features of electric ranges and water heaters so that more of them can be sold, sold more effectively, was the purpose of the councils. First subject was an exposition of the rates applicable to these appliances, and an excellent detailed analysis of just what a range installation consists of and what it costs. This was done to build an appreciation for this factor of a sale and thus eliminate an apologetic or critical attitude toward it. The value of adequate wiring was then made evident in this council.

Next came two meetings, one on ranges the other water heaters. in which the manufacturers' representatives were each given an opportunity to go into every detail of their own product to acquaint the dealers and salesmen of sales features possessed by their merchandise. Next came two meetings in which the right and wrong ways of cooking on an electric range were demonstrated. This gave the dealers the answer to most of their complaints, and one of the best sales arguments on the truly economical way to use the range. The last council went into operating costs very thoroughly, giving dealers an excellent background of information from which to make estimates of cost for any prospect desiring one. Trade-in allowances were discussed and 25 typical questions usually asked about a range were answered satisfactorily.

Attendance at these councils was regular and enthusiastic, and dealers and dealer salesmen revealed themselves thoroughly capable of making the most of the information offered to make more sales and profits during the present campaign and thereafter.

### Refrigeration Campaign Strong

While reports of sales in the refrigeration campaign of the industry, sponsored by the Electric Appliance Society, have not yet begun to come in, there are indices that spell success. Requests for additional copies of the campaign pamphlets and display and advertising material have exceeded expectations. Advertising by dealers and distributors throughout northern California is more active than at any previous period and sales activity is at a high pitch. Results of the campaign in units sold will be announced in succeeding issues, along with pictures of prize winning window displays and details of the ad writing contest.

●

ELECTRICAL GIFT MONTH—June—provides a plan book for industry promotion campaigns by the Electrical Housewares Program of the Edison Electric Institute and manufacturers of electrical table appliances. A newspaper ad writing contest in which department stores, utilities and other houseware dealers are eligible to participate, with prizes of $100 in each class, is the stimulus for the national campaign. The prizes will be in merchandise selected by the winners from catalogs of contributing manufacturers. Promotional material is offered at minimum cost to dealers and utilities.

●

## Another Contest on Ranges Sponsored in Portland

Repetition of its successful contest idea for the cooperative promotion of electric ranges has been undertaken by the Portland General Electric Co. in cooperation with dealers of Portland and surrounding towns. Each of the types of ranges handled by dealers locally is individually featured in one advertisement announcing the contest. Toegther with the featured range is a list of the stores handling that range. One range is given away as the prize of the week in the contest.

Contest rules require the writing of 25 words or less telling why "it's more fun to cook with an electric range." A list of the reasons why it is fun to cook with an electric range is given in one column to guide the contestants. A $200 range is given as the prize for each week's contest.

Entries are to be submittted in person by the entrant at any store selling electric ranges. The entry must have a contest coupon attached which is signed by a staff member of the store to which the entry is submitted. Only one entry each week is allowed and entries by mail are disqualified. Judges are Berkeley Snow, chairman, secretary, Northwest Electric Light & Power Assn.; Jane Martin, Pepco home economist, and Robert E. Sheehy, Electrical Wholesalers, Inc. A coupon at the bottom of the ad is likewise required.

Supporting the campaign is a broadcast every Tuesday and Thursday over KOIN at 11:15 a.m. entitled "Cooking for Fun."

●

REPETITION of a successful sales meeting of last year for Fresno gas and electric appliance dealers, wholesalers and sales staffs came when Samuel F. Worswick, sales counsellor of San Francisco, addressed a meeting April 6. More than 100 dealers attended. Other speakers on the program were C. F. Cowan, chairman of the meeting under the sponsorship of Fresno Electrical Appliance Society; W. R. Turpin, past president; L. J. Tappan; T. J. Buford and Frank A. Easton of the merchandising department, San Joaquin Power. Mr. Worswick's talk was an inspirational and educational one on "Salesmanship and Cooperation."

**Scientifically planned all-electric kitchen designed by Ken Davidson, of the publicity department, B. C. Electric Railway Co., and installed at the company's Granville St. showroom (left). (Right) Tying-in closely with its kitchen modernizing department, complete with planning service, and its "Jane Marden" department, which conducts the radio program and cooking classes and demonstrations under the leadership of Beth Fillmore, Portland General Electric Co. installed a new model kitchen, March 29. George E. Kelly is supervisor of the home service girls, another department playing an important part in the company's promotion of ranges and water heaters**

# Survey Points the Way to Greater Range Sales

WHO buys electric ranges and why do they buy them? In the answers to these questions will be found useful information that can be employed to build range sales. With this thought in mind Reese Mills, manager of the range and water heater department of the Westinghouse Electric & Manufacturing Co., supervised a field survey among range salesmen, range users, dealers and utilities designed to reveal buying motives and other marketing factors. To obtain a true cross section of actual field conditions, 15 investigators conducting the survey covered sections of 17 different states. Much of the work was done here in the West.

Altogether 413 range users, 113 salesmen, 86 range dealers, 71 operating utilities and 19 department stores contributed to the information obtained. Briefly here are some of the findings that can be employed profitably in expanding range sales:

What income class buys ranges?

Economic class A purchased 18.7 per cent
Economic class B purchased 25.1 per cent
Economic class C purchased 46.9 per cent
Economic class D purchased 7.8 per cent
Retired people purchased 1.5 per cent

Class A represented merchants, banking and financial men and manufacturers. Class B was made up of professional men, executives and public officials. Class C was made up of skilled mechanics, salesmen, clerical workers and farmers. Class D represented unskilled laborers.

How long had the range user been housekeeping, i.e., how many years of housekeeping experience did she have?

Less than one year..... 3.6 per cent
1 to 5 years.....12.2 per cent
6 to 10 years.....15.1 per cent
11 to 15 years.....19.3 per cent
16 to 20 years.....16.5 per cent
21 years and over.....33.3 per cent

This showed that ranges were not being sold to the younger housewives, but rather to housewives who had had considerable experience and knew all of the problems of housekeeping.

What was the monthly rental value of the homes of these users? Investigators found that 82 per cent lived in homes having a monthly rental value of $50 or less. Only 7 per cent lived in homes that had a rental value of more than $75 per month. In 71.9 per cent of the cases the users owned their own homes.

What type of range had been used previously?

Gas .....60.0 per cent
Oil .....16.0 per cent
Electric .....12.7 per cent
Coal ..... 8.5 per cent
Other ..... 2.8 per cent

This is both a measure of competition and an indication of the fields where prospects might be developed.

Why was an electric range purchased?

Wanted it .....56.7 per cent
Old range worn out....27.2 per cent
Old range unsatisfactory ..... 6.8 per cent
Other ..... 9.3 per cent

Answers to this question reveal the interesting fact that users purchased an electric range because they *wanted one.* This is an indication of the public acceptance that electric cookery has won.

What factor developed the user's first interest in electric cookery?

Experience of friends..77.4 per cent
Magazine articles .....12.5 per cent
Demonstrations .....12.0 per cent
Cooking schools .....11.7 per cent
Home solicitations ....11.5 per cent

More than one reason was frequently mentioned but eight out of ten women credited the experience of friends as one reason for purchase. This is proof that the plan of following the user as a means of securing prospects is the best source for obtaining leads.

Why did the user buy after she became interested, i.e., what really sold her?

Cleanliness .....75.8 per cent
Economy of operation..26.1 per cent
Easier to use — saves time .....25.6 per cent
Better cooking results..20.6 per cent

Here again many housewives named more than one reason for buying. No other buying motive received enough mention to be included in the above list although safety, coolness and healthfulness were referred to on occasion. It is interesting to know that range salesmen themselves reported that these four advantages were the key arguments to use in convincing the housewife on the desirability of electric cookery. They did, however, place convenience ahead of economy of operation.

According to Mr. Mills this market analysis formed the basis for product improvement and promotional arguments to be used in promoting more business for salesman, dealer and utility.

●

## Trade-in Features Spokane Range Campaign

Offering a trade-in allowance of $25 for an old fuel stove on a new electric range and a $7.50 allowance on old water heaters on a new automatic electric water heater, Washington Water Power Co. drew a similar offer from the Spokane Gas & Fuel Co. on gas ranges and water heaters. Both offers are for a limited period and all indications point to it being a case of "let the best man win." Dealers are tying in on the offer.

Meanwhile, the Washington Water Power Co. is capitalizing strongly on its Reddy Kilowatt promotion. With a contest to the public offering $2 each for new rhymes about Reddy Kilowatt, the little trade character is being made known to all the public. Meanwhile, Reddy sponsors various campaigns and publicity ideas. He is engaged in advocating an all-electric step-saving kitchen as part of the modernization plan.

●

## "Spring Fair" Decided by San Diego Bureau

A SPRING fair rather than a refrigeration show has been determined upon by the Bureau of Radio and Electrical Appliances of San Diego County for May 22 to 26 in the same building in Balboa Park which housed its Christmas show. Decision to enlarge the scope of the show from refrigeration alone to all domestic appliances came at a recent board of directors' meeting.

Refrigerators still will be emphasized to a greater exent than possibly other lines, but distributors and dealer members felt that the opportunity to promote all home appliances at such a show should be capitalized if possible.

Attendance likewise is expected to increase to some 50,000 rather than a more limited number at a refrigeration show. In this way not only those who are interested in refrigerators will come but many thousands who have no idea of purchasing this year but who after seeing the demonstrations of the new products may decide to buy.

One of the impelling factors in the decision has been that ranges, water heaters, laundry equipment as well as refrigerators are definitely in the public mind. Most manufacturers of kitchen and laundry equipment bring out new merchandise in the early spring and thus will tie in. Considerable stress will be placed on kitchen modernization and kitchen planning with an

attempt at a cooperative arrangement with architects. Endeavor will be made to have a booth for architects at which visitors interested in modernizing their kitchens may consult with those doing this type of work.

The exhibits will be arranged under brand names rather than dealer names. Manufacturers, distributors and exclusive representatives will do the exhibiting. Only those dealers having exclusive representation will display. This is to prevent duplication of exhibits and to feature the brand names rather than the distributor or dealer name.

By fortunate circumstances the space rate will be less than in previous shows. Exhibitors are to be limited to a maximum of six spaces. Rates include building and decorating of backgrounds and furnishing of standard booth signs. Spring decorative motifs will be used throughout.

Promotion will include extensive advertising on the radio, in newspapers and on car cards. Radio remote controls will be run for broadcasts from the stage each night. Door prizes will be abundant. Afternoon demonstrations of "cold cookery" emphasizing the savings possible with electric refrigerators, are being planned. Special stunts to stimulate interest in all types of appliances will be organized, according to J. Clark Chamberlain, manager of the Bureau.

●

## Fresno Dealers Determine Trade-in Schedule

Recognizing the vital need for a definite trade-in allowance on used mechanical refrigerators, the Fresno Electrical Appliance Society recently compiled the trade-in allowances printed below.

*Many refrigerators in Central California homes have been in service five years or more and do not compare favorably in appearance or performance with new models. For this reason owners of old refrigerators are eyeing the new models enviously, and trade-ins are expected to reach a new high this year. A definite trade-in agreement among refrigerator dealers is believed necessary to help prevent unfair competition, price cutting and losses.*

The trade-in agreement is not a covenant to maintain fixed prices. It is merely a scale based on reasonable business principles to act as a guide. Use of it will avoid technical price cutting through the abusive practice of placing fictitious and unprofitable valuations on second-hand merchandise received as a credit.

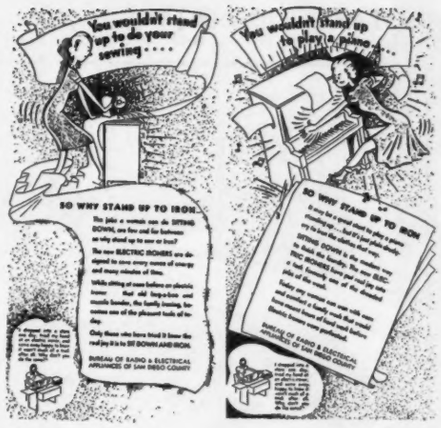
Also included is a clause declaring free trials in the homes of prospects to be unfair competition.

●

SCHEDULE OF TRADE-IN ALLOWANCES ON USED MECHANICAL REFRIGERATORS

| Years Old | Cu. Ft. Capacity 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 40.00 | 55.00 | 65.00 | 75.00 | 80.00 | 85.00 | 95.00 | 110.00 | 120.00 | 130.00 |
| 2 | 36.00 | 50.00 | 58.00 | 70.00 | 72.50 | 75.00 | 85.00 | 100.00 | 110.00 | 115.00 |
| 3 | 30.00 | 40.00 | 48.00 | 55.00 | 60.00 | 62.50 | 70.00 | 80.00 | 87.50 | 95.00 |
| 4 | 22.50 | 32.50 | 38.00 | 45.00 | 48.00 | 50.00 | 55.00 | 65.00 | 70.00 | 75.00 |
| 5 | 16.00 | 22.50 | 27.50 | 30.00 | 32.50 | 35.00 | 37.50 | 45.00 | 48.00 | 52.50 |
| 6 | 10.00 | 13.50 | 15.00 | 17.50 | 20.00 | 21.00 | 22.50 | 22.50 | 27.50 | 30.00 |

NOTE: For full porcelain add 10% to above prices—Deduct 15% for "economy" box.
It is suggested that the resale prices established on reconditioned boxes taken in trade, be double those set forth in the above schedule.
For older styles of refrigerators, the same allowance will be made as for 6-year-old boxes.
The above schedule applies in all cases except those of policy adjustments.




**Reduced to an absurdity is "standing up to iron" by this series of humorous and human ads which Forrest Raymond has provided for the Bureau of Radio and Electrical Appliances, San Diego**

## "I see by the papers—"

DENVER'S refrigeration code works. Dealers who had neglected to mention refrigerator specials as being 1936 models, corrected their error in subsequent advertisements.

●

SYMONS, of Butte, Mont., featured its 20-year employees in a 20-Year Club sale. Among the promotions were a cooking school and special emphasis on electric appliances.

●

WESTINGHOUSE announced the results of its kitchen-proved tests in Salt Lake City in the home of Mrs. William J. Fouyer. Data on the two-week tests gave running time, total time, kilowatt-hours consumed, temperatures maintained, etc. Tie-in ads of dealers accompanied the Westinghouse Electric Supply Co. feature ads.

●

HALE BROS., San Francisco, has had Sterling Electric Co. install photo-electric reflecting devices in its store windows so that nighttime window shoppers may have the window lighting turned on automatically as they pass and intercept a light beam. The stunt is a good attention producer as well as a means of conserving current.

●

CITY LIGHT, Seattle, flashed with a sale of a full carload of Frigidaire refrigerators.

PUGET SOUND POWER & LIGHT, Seattle, opened a model kitchen display at the Central Housing Bureau, offering housewives modernization plans.

●

HOSTETLER NORGE STORES, INC., of Seattle, featured Norge equipped homes with small drawings of each such home in a large half-page ad. Sixteen such homes were illustrated, the product announcements being confined to a small strip at the bottom.

●

JOSLIN'S, Denver, was taken over bodily by the women of the store and of the community for a spectacular "Women's Day." Prominent women leaders and club women acted as hostesses for a snack at the model kitchen.

●

DENVER DRY GOODS CO. staged another of its open evenings from 7 until 9 recently. Such open evenings have proved especially good for appliance sales because husbands accompany wives and sales decisions are reached more quickly.

●

H. E. SAVIERS & SON, INC., Reno, made a sensational window demonstration showing of the Westinghouse "Hell's Kitchen," backed up by extensive newspaper advertising. Names of dealers handling Westinghouse refrigerators through the Saviers distributorship were also featured.

●

PRESIDENT'S daughter, Mrs. Anna Roosevelt Boettiger, heads up the Seattle Post-Intelligencer's Homemakers Club, featuring cooking schools and food and appliances.

●

COOPERATIVE advertising of specials is done for a large group of stores in southern California under the general heading "'Lectric Age Specials." The stores are known as 'Lectric age stores, although independently owned. Thus many small stores participate in large advertising.

●

JENSEN-BYRD CO., Spokane, announced its appointment as distributor of L & H ranges with tie-in advertising on the $25 trade-in allowance featured by Washington Water Power Co. and other Spokane dealers.

●

BROWN-JOHNSTON CO., Spokane, tried the drug store idea, offering a two-for-one fixture special. Two fixtures regularly priced at $16.95 were offered for $17.95.

●

SCHOENFELDS', Seattle, is modernizing its complete exterior. Special emphasis on appliance display is expected.

●

DORRIS-HEYMAN, Seattle, believes lamps can sell in summer as well as winter. It features "delightful lamps for summer" in a recent lamp ad.

●

LACHMAN BROS., San Francisco, offers the home advice of its home economist, Miss Cook, to teach purchasers of appliances how to use them to best advantage.

●

REDLICK-NEWMAN CO., San Francisco, staged a formal opening of its new south side annex, featuring new floor of model rooms and "San Francisco's finest appliance department." A home furnishing style show was likewise featured.

●

THE EMPORIUM, San Francisco, staged one of its annual "Gertie gadget's international household expositions." Fifty demonstrations, extensive window displays of kitchen appliances and gadgets of all types and a feature attraction of a "magic dial" for the operation of any appliance were highlights of this colorful promotion.

NEXT WESTERN HOME FURNISHING MARKET in San Francisco is to be held during the week from Aug. 2 to 7 in the new Western Furniture Exchange building, according to A. Cameron Ball, business manager. So many have been the requests for space in the new building that not only is the fourth but also a large part of the fifth floor to be devoted to appliance displays. General demand for space has caused increase of the building height one additional story from that originally planned. Progress of the work is such that the opening will be held in July prior to the usual summer market. Plans are under way for a radio and appliance trade dinner program in conjunction with Market Week.

●

FORMER EXHIBITORS of the Electrical Age Exposition last year are being queried by the Electrical Development League of Southern California as to just when a second exposition would be most effective. In a recent ballot of last year's exhibitors 40 exhibitors were queried and 34 expressed desire for a second exposition sometime this fall. At the board of directors' meeting, however, the question of whether it would not be better to hold the exposition coincident with the announcement of new spring merchandise rather than before Christmas was submitted back to the former exhibitors for decision.

## MISTAKEN IDENTITY

—by Russell

"Shure, and I get my ould rollin' pin back—or I quit!"

## APPLIANCE SALES REPORT

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Department of Utilities

APPLIANCE

| *March, 1937* | L. A. Bureau of P. & Lt.[1] | | Idaho Power Co.[2] | | P. G. & E. Co.[3] | | San Diego Cons. G. & E. Corp.[4] | | San Joaquin Lt. & P. Corp.[5] | | Southern Calif. Edison Co. Ltd.[6] | | Utah Power & Lt. Co.[7] | | Wash. Water Power Co.[8] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Current | 3 Mos. | Current | 3 Mos. | †Current | †3Mos. | ‡Current | ‡2 Mos. | Current | 3 Mos. | Current | 3 Mos. | Current | 3 Mos. | ‡Current | ‡2 Mos. |
| Ranges | 495 | 1,190 | 957 | 1,410 | 319 | 844 | 55 | 120 | 164 | 427 | 676 | 1,502 | 984 | 1,577 | 123 | 211 |
| Water Heaters | 124 | 348 | 52 | 124 | 185 | 560 | 58 | 113 | 75 | 243 | 267 | 716 | 154 | 234 | 41 | 110 |
| Air Heaters, aux. | 62 | 783 | 29 | 317 | 515 | 5,464 | 275 | 775 | 13 | 217 | 107 | 1,665 | 110 | 748 | 161 | 554 |
| Air Heaters, 220 | 12 | 146 | | | 87 | 349 | | | 50 | 296 | | | | | | |
| Refrigerators | 3,613 | 6,476 | 675 | 1,005 | 2,198 | 6,250 | 400 | 775 | 894 | 1,298 | 4,399 | 8,397 | 846 | 1,496 | 270 | 434 |
| Dishwashers | 4 | 16 | 1 | 1 | 3 | 34 | | | 5 | 11 | | | 10 | 24 | 1 | 1 |
| Washers | 1,834 | 4,950 | 365 | 1,134 | 2,159 | 7,163 | 300 | 600 | 402 | 1,016 | 2,934 | 7,752 | 848 | 2,675 | 324 | 603 |
| Ironers | 281 | 644 | 38 | 149 | 464 | 1,862 | 60 | 125 | 65 | 199 | 443 | 1,311 | 45 | 121 | 32 | 63 |
| Vacuum Cleaners | 722 | 1,576 | 133 | 356 | 2,236 | 7,453 | 185 | 385 | 111 | 305 | 1,318 | 3,594 | 476 | 1,834 | 231 | 393 |
| Radios | 1,783 | 6,174 | 625 | 2,170 | 7,768 | 33,505 | 1,050 | 2,200 | 581 | 1,771 | 4,893 | 14,092 | 942 | 3,944 | 1,199 | 2,365 |
| Mixers | 149 | 490 | 40 | 228 | 312 | 3,188 | 100 | 190 | 43 | 140 | 335 | 1,138 | 206 | 706 | 119 | 286 |
| Cookers, Casseroles | 44 | 163 | 16 | 143 | | | 45 | 95 | 17 | 61 | 76 | 231 | 81 | 1,468 | 213 | 361 |
| Irons | 410 | 1,358 | 327 | 1,099 | | | 425 | 825 | 263 | 761 | 1,539 | 4,280 | 1,009 | 3,262 | 580 | 1,160 |
| Waffle Irons | 113 | 376 | 75 | 491 | | | 225 | 425 | 65 | 246 | 424 | 1,516 | 385 | 1,383 | 155 | 311 |
| Toasters | | | 118 | 584 | | | 250 | 500 | 119 | 356 | 623 | 2,043 | 450 | 1,545 | 334 | 622 |
| Table Stoves | 157 | 493 | 80 | 449 | | | 60 | 130 | 88 | 245 | 288 | 895 | 862 | 2,837 | 121 | 429 |
| Heating Pads | 75 | 432 | 39 | 306 | | | 250 | 650 | 27 | 234 | 243 | 1,394 | 315 | 1,230 | 162 | 353 |
| Curling Irons | | | | | | | | | | | 71 | 203 | 523 | 1,446 | | |
| Coffee Makers | 95 | 286 | 130 | 517 | | | 250 | 500 | 108 | 305 | 341 | 1,077 | 604 | 1,980 | 291 | 598 |
| Sewing Machines | | | 8 | 73 | 1,094 | 3,448 | 65 | 140 | | | | | 105 | 380 | 54 | 102 |
| Clocks | 174 | 523 | 24 | 197 | | | 425 | 750 | 100 | 354 | 530 | 1,610 | 398 | 1,361 | 416 | 617 |
| Fans | 22 | 45 | 8 | 71 | | | | | 9 | 20 | 31 | 78 | 8 | 94 | 20 | 56 |
| Floor Polishers | | | | | | | | | | | | | | | | |
| Sun Lamps | 44 | 93 | 7 | 39 | | | | | | | 48 | 167 | 15 | 58 | 8 | 9 |
| Reflector Lamps | | | 164 | 915 | | | | | 194 | 465 | | | 924 | 3,367 | 1,019 | 2,358 |
| Miscellaneous Lamps | | | 233 | 1,505 | | | | | | 243 | | | 745 | 2,786 | 482 | 1,491 |
| Yard Lights | | | | | | | | | 35 | 67 | | | | | | |
| Misc. Small Appl. | 234 | 719 | | | | | | | 165 | 540 | 666 | 2,043 | | | | |

*Sources:*

[1] Compiled by Los Angeles Bureau of Power and Light for territory served by that system.
[2] Figures compiled by Electric Equipment Sales Association. Include power company sales and sales of all reporting dealers—about 60%.
[3] P. G. & E. reports sales of major appliances only based on accurate reports available from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. Total dealers include gas as well as electric dealers.
[4] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Clocks, fans, included under miscellaneous.
[5] Includes dealer reports from Midland Counties Public Service Corporation also. Compiled by Valley Electrical Supply Company.
[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.
[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.
[8] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.
† Under current month heading is shown previous month's figure. Lag of one month is also shown in total sales for year to date, which began December, 1936.
‡ March report was not available at time of going to press.

As you plug in washer explain approved cord

Braid towels together to explain washer action

Suggest ownership by letting prospect load washer, operate controls, get the "feel" of it

While washing explain features and tell what they mean in long life and satisfaction

Clean clothes convince the prospect

Let her wring clothes to feel possession

Explain there's no water lifting with a pump equipped washer

Assume ownership, clean up the washer, explaining it will last longer thus

Review the advantages of her KEEPING the demonstrated washer (see adjoining column) then ask for the order. Do so by a question that suggests the long usefulness that the appliance will have for her, such as: "Now that you've done your most difficult washing, getting acquainted with what to do, suppose you take this new helper into your home to keep? It will give you years of freedom from washing drudgery. Shall we sign up this new servant right now?"

ELECTRICAL WEST COOPERATIVE

# APPLIANCE SALES GUIDE

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# Demonstration Still Sells Washers, Ironers

May 1937

HOME LAUNDRY

## Buying Reasons---

Use them to SELL Washers

- Clean clothes— whenever needed or wanted
- Independence from routine laundry delivery day
- Less investment in clothes— can wash oftener
- Less clothing outgrown— use and wear more
- Clothes last longer-- home washing is gentler
- Particular care on special things like lingerie
- Saving in money— laundry costs less at home
- Relief from backbreak—machine does heavy work
- Saves time on washday—get washing done quicker
- Time for other activities—wash day no longer blue
- Certainty of sanitary conditions— no contagions
- No loss of treasured articles— never leaves home
- Pride of owning modern equipment—up to date
- *(Special features too, should be sold in terms of what they mean to the user—for instance:)*
- Pump—No need to lift water in or out of machine
- New wringers—complete protection, can't forget
- Spinner—More water spun out, more safety in use
- Tray washer— saves space, handling of water

# SHORT SALES TALKS
## That hurdle Sales Resistances

## NUMBER 5A — HOME LAUNDRY

***When the prospect says—***

***Prospect:*** **Why, that's ridiculous. I can get a washer for half that price. What possible justification can there be for this terribly high price?"**

STRONG language. All prospects may not be so emphatic, but some are. Nevertheless the great variance in prices of washers causes more sales headaches than any other problem. There is little a salesman can do about the price structure, or how it is derived. There IS something every salesman can do—sell his own product and price in spite of anyone else's proposition. See how Bill meets this all too typical situation.

BILL SMITH: "I can understand your wondering why there is such a divergence in washers and prices. They all look similar until their details are examined. Unless you were shown the difference you couldn't be expected to know the difference. Perhaps I did not make it clear. I'm sorry. You see, for a machine that merely will do a washing, there is this low priced model. It does a completely satisfactory job, relieves you of the hand drudgery of washday, saves time and gives you sanitary washing under your own scrutiny and care. Then this next model adds the convenience of emptying the tub for you by means of a fast, trouble-free pump. That saves you the lifting and carrying of water, makes washday that much easier on your back, saves you more time. Then this next model has several additional safety and convenience features on the wringer. See how easily it comes apart for cleaning. That, too, saves you time. *(Bill shows other individual features and refinements in this same manner, each time telling what this means to her. If he has a spinner model, he explains it thus:)* And here is the ultimate in refinement, a washer that spins the clothes as dry as you care to have them. It is gentler on your clothes, easier on buttons and other trimmings, and will enable you to wash pillows and blankets at home at considerable saving. From what you have told me of your own requirements you can be served best by either this model, or this. And if you decide today you can begin using it tomorrow, to relieve you of one of your hardest household tasks. Why not feel the freedom, the peace of mind that comes from owning and using a washer that you know will do washings you might otherwise never attempt to do because of expense and bother? Shall I send this model out tomorrow morning?"

● **Among the "best sellers" is always the washing machine. In fact many dealers feel that most women are already sold on a washing machine and need only to be shown the variety they seek in order to select one of a type they want. Successful salesmen are not satisfied to let the prospect so run the sale that the only consideration is one of price. They sell up to the type of washer which will really give the best service in the home. . . . Ironers are increasing their popularity, but still require more selling to overcome resistances of habit and fear. . . . The ideal sale is a combination of both. Certainly no alert salesman sells one without telling of the need for the other at the same time. Such salesmanship insures him a repeat customer, further orders, more commission. . . . Salesmen today find that many customers are apt to know more about their merchandise than the salesman himself. Good housekeepers take pride in studying before buying. They read their "business magazines," the women's magazines, and learn all the features to ask for. This places the salesman who does not study both his product and his selling procedure at a big disadvantage. Smart buyers can ask "the most embarrassing questions." . . . Bill Smith, successful salesman, has found that it is good insurance to know your product so well that you cannot be embarrassed. He knows that an understanding of the woman's homemaking job helps him to talk her language, meet sales resistances and overcome them. See how Bill handles some difficult sales resistances, asks for the order, and lands more sales. Then do likewise in similar situations to your own profit and satisfaction.**

***When the prospect says—***

***Prospect:*** **"I'm sure I couldn't run an ironer, and it would be just a waste of money if I could not do all the wash on it."**

HERE you have the strongest stumbling block—habit. While men are eager to try new machines, women often secretly fear them. It is only by relieving this fear that they will attempt to change a habit which has now become easy to follow. The best way to relieve fear of operating difficulty, Bill Smith has found, is to have the prospect operate the machine herself.

BILL: "Couldn't run an ironer? I appreciate how it

might seem difficult at first, but won't you just sit here and I'll tell you just what to do to make it easy to operate. Yes, right here, please. *(Seats her at the ironer).* Now before you touch anything, just feel how much more comfortable it is to sit here, to do a big ironing, than to have to stand for hours over an ironing board. Before my wife had an ironer, she used to dread washday. She liked her washer, and was always tempted to do up a few extra things, like curtains, couch covers, and the like. But ironing just about killed her until we bought our ironer. Now she actually enjoys doing up shirts and dresses that challenge her skill a bit more than the flat pieces. Now if you will turn that switch the heaters will start in the shoe. That other knob there sets the motor going, all ready to start. Now take this piece of material and just place it on the roll yourself. Press your knee against the control—see, it does all the heavy pressing and pushing for you."

Give the prospect a chance to try it herself

PROSPECT: "But could I do a shirt as easily? It wouldn't pay just to have it for flat work, the least of my troubles."

BILL: "I'm glad you brought that up. A shirt looks complicated, doesn't it? But after all, a shirt is only a group of flat pieces of different shapes, sewed together, isn't it? It is just a case of doing each flat piece by itself. When you have done each one in turn, you will find the entire shirt has been ironed and it was no trick at all. This direction book, you will find, gives simple and easy instructions. You drive a car, I am sure. Well, one nice thing when you are learning to drive this simple ironer is that you will find it like child's play compared to driving a car —and you will not have to listen to any back seat driving while you learn. You already have a washer. Why not complete your home laundry now? It simply means that you will insure yourself of plenty of clean clothes all the time. You will require less outlay in clothes for they can be washed oftener. You will know that your delicate lingeries and colored pieces receive the right care. Best of all, your tedious hours over an ironing board will be banished forever. Let me deliver this ironer to you tomorrow."

## *When the prospect says—*

***Prospect:* "Our place is so small. We wouldn't have room for an ironer, much as I'd like one.'**

**THIS is often the case in small houses and in apartments. Frequently this excuse is given merely to delay decision and allow more time for shopping around. The salesman who continues to sell when this answer is given is often surprised with an eventual sale, so it is worth while trying. Bill Smith usually follows through like this:**

BILL: "You have a small place? That does make a difference, doesn't it? Well I am glad to say that manufacturers have recognized that problem and here is their answer to it—the table top model (or the cabinet). It serves you in two capacities, as a work table for kitchen or sewing room when not in use ironing—and ready at a moment to do a whole ironing or a few pieces. It will press your husband's suit, as well as your own tailored garments. With this ironer you may sit at ease while ironing, saving your strength, keeping cool instead of having your face over a hot iron. It will save you two-thirds of your ironing time on flat pieces, one-third on shirts and dresses. Why not take the last remnant of hard backbreaking work out of your washdays? This attractive cabinet will look nice in your home too. When is your next washday? I can deliver it in time for then. Shall I?"

**AFTER summing up good, homey features of the ironer or washer, in the prospect's own language, Bill does not hesitate to ask her to buy. She must make a decision then. If he has created a convincing picture of how she can profit from its use, it will be hard for her to refuse. In doing so she will reveal any remaining point on which she is still unsold. Then the salesman can concentrate on that resistance, ask for the order again. That's how sales are made.**


CALIFORNIA OREGON POWER CO. · PORTLAND GENERAL ELECTRIC CO.
MOUNTAIN STATES POWER CO. · PUGET SOUND POWER & LIGHT CO.
PACIFIC POWER & LIGHT CO. · IDAHO POWER CO.
NORTHWESTERN ELECTRIC CO. · WASHINGTON WATER POWER CO.
UTAH POWER & LIGHT CO.

# BEST DISPLAY

## OF IRONERS IS AN ACTIVE

# DEMONSTRATION

SINCE habit is the real competitor of the electric ironer, constant active demonstration is the very best type of display, either in window or store. Habits of years, with hand irons, are only broken down by familiarity with the sight of ironing on an ironer, plus personal proof that it is easy to do. Most effective window displays are those in which demonstrators work in the window. A clever one is shown at the top of this page, contrasting hand ironing to the easier machine operation. • On your floor place the ironer so that the open end is toward store traffic. Operation is more easily observed thus. Invite a customer to sit down and try something. Remind her of the benefits it will bring (see list below). Rise and place chair under her as you would at the dinner table. Make her comfortable. When she is at ease, show her the controls; let her operate them. Give her something to iron—a towel is often a good sample. Let her finish a shirt begun by the demonstrator. Give her the "feel of the wheel." Then tell her

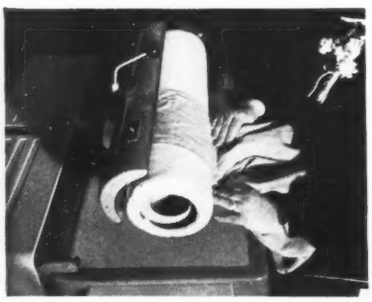
### Why She Should Buy an Ironer

- Saves money— in clothing, laundry, pressing
- Saves wear and tear on clothing— no straining
- Presses suits— pleated skirts, professionally
- Sweaters, knitted wear, velvets, shaped, pressed
- Shrinks yardage before dressmaking— saves money
- Wet wash—saves on laundry sent out by doing ironing
- Saves effort— You can sit instead of stand
- Does work *for* you— you merely supervise
- Saves lifting heavy iron— also tired feet
- Is so much cooler— heat does not rise into face
- Does better work—professional touch soon acquired
- Linens crisp and glossy— patterns brought out
- Curtains hang straighter—need no racks, stretchers
- Less starch needed— prevents scorching easily
- Last pieces as nicely done as first— not tired
- Easily moved— ironing can be done in any room
- Kills moth larvae—by running woolens through heat
- Other uses— pressing rag rugs—they lie flat
- Saves time— larger surfaces ironed at a time
- Economical— operate at 3 to 5 cents an hour
- Spare table— (with table models)—double duty
- Completes the home laundry— most important unit
- Pride of having modern equipment— be modern

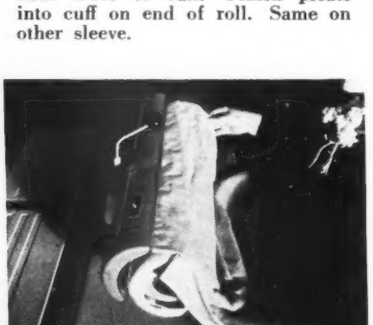
# Quick Way to Iron a Shirt

### for a store or home demonstration

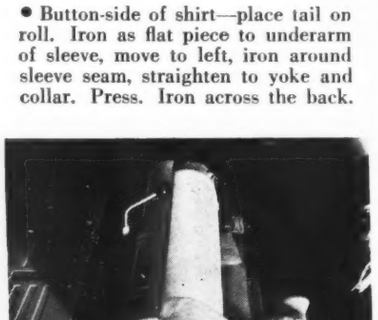
Speed and ease of operation are what you want to show the prospect. A little practice will give you speed and facility in ironing a shirt by this method. Select a colored madras shirt. Sprinkle and roll ready to iron. In demonstrating unroll, shake out, then fold shirt at back of yoke seam. Lay yoke on roll at an angle. Iron to collar band, then across back of yoke. Continue to other side of yoke. If wet, press at intervals. • Take sleeve by underarm seam, place cuff on roll, placket up, turn roll to top of placket, iron to armhole. Press armhole seam. Put sleeve under roll and over again, ironing other side. Iron both sides of cuff. Finish pleats into cuff on end of roll. Same on other sleeve.



• Button-side of shirt—place tail on roll. Iron as flat piece to underarm of sleeve, move to left, iron around sleeve seam, straighten to yoke and collar. Press. Iron across the back.



• Pull shirt to right at slight angle, well up to get to yoke. Iron straight across back. Iron other side in same manner, only right side out.



• Collar and band come last. Place both over end of roll. Iron wrong side, then right side. Press button hole at front. Shape the collar.

• With practice this should take only 3 to 4 minutes. Also it is easy to show a beginner. Get the prospect to try it herself.

• Ironrite and flatplate ironers use slightly different method. On the former shirt is arranged on the shoe rather than roll. Get instructions from distributor. Flatplates, arrange shirt on bottom pad as directed above, and press. The object in any case is to simplify.

# Electra's Husband

## More Power to You?

ELECTRA said I was politically biased when I gave her the following simple document to read after she had listened to the last "fireside" chat. My answer was that she just imagined that Hoover or Roosevelt the First or McKinley had proposed to increase the membership in the Supreme Court from nine to 15. I don't know who the author is, but my hat is off to him. If he holds a copyright, I extend my apologies to him now and promise to give him full credit if he will let me know. And if anyone else has a simpler or more lucid statement of the discussion over the proposal to "pack" the highest tribunal in this land, please send it to me.

"A statesman is only a successful politician. If he wins, many people follow him blindly. They forget that he is a man controlled by the same motives and impulses as all other men. He may be better than the average; he may be worse; but you can count on one thing—that ambition is the besetting sin of all politicians.

"Politics is one of the oldest trades in the world. Every President that this country ever had was a politician. Every Congressman and every Senator, every Governor of every State and every candidate for public office is a politician. All of the New Dealers are politicians. Roosevelt is a politician. So are Farley, Ickes, Wallace, Hopkins, Tugwell, and Miss Perkins. They have the same ambitions that every politician in history has had—to get in office and to stay there.

"History is full of politicians who started out as good rulers and wound up as bad ones. Napoleon was a very good ruler for France at first. He put France on its feet after a terrible revolution. Then he became ambitious to be emperor of all Europe, and millions of Frenchmen died because of his lust for power. He told Frenchmen they were dying for the glory of France. They thought they were. But we know better—they died because of Napoleon's ambition for more power.

"The American revolution was fought because the people of this country did not like the way the English politicians ruled them.

"The leaders of the American colonies were very wise men. They knew that they had to have politicians. But they had all studied a lot of history and they knew there were more bad politicians than good ones and that the bad ones wanted the citizens' hard-earned money, seized their property and when the citizens protested, threw them into jail.

"So these wise men decided to set up our government in such a way that before it was turned over to the politicians to run, it would be fixed so that those politicians would have to behave themselves.

"The way they did it was to write a Constitution. The Constitution is a law made by the people to govern politicians. It tells them what they can do and what they can not do to you. It tells them they may have so much power to control you and no more.

"But since no law is any good unless somebody enforces it, these wise men set up an independent court that the politicians do not control, so that if the politicians did seize power that was not given to them by the Constitution, there would be someone who could say to them, 'You can't do that.' This is the Supreme Court. Our Constitution and our Supreme Court were the first effective schemes in all history to control politicians and limit their power to govern and to tax.

"As a result, in this country we have free speech, because if the politicians tried to put someone in jail for attacking them the Supreme Court would say, 'Let him alone.'

"Also, we have freedom of worship, which many other nations have lost. And our politicians can't take your money or your property from you without paying you for it, as they can in so many other countries today.

"These are only a few of the things we have because we have a law (the Constitution) to govern our politicians and a Court to make them obey that law.

"What has happened in this country under this law to keep politicians in their places? Since it has limited their power it has prevented them from meddling in our private affairs and plundering us. As a result, our cost of government, until the last few years, has been low and this country has grown and prospered like no country in all history.

"Ever since the Constitution was established, politicians have schemed to get around it—to get more power than it gave them and to weaken the Supreme Court. They have frequently tried to limit the Court's power and, as usual, are talking about it again. They have tried to get the people angry with the Court for its decisions. They have tried to scare the people by saying the country would go to pot after some of the Court's decisions. That is what President Roosevelt tried to do when the Supreme Court threw the NRA and the AAA out.

"But in the past all of these attacks have failed. The people of this country still realize that the Supreme Court is the only protection they have against politicians seizing more power—the only protection of our rights we have, short of revolt.

"Now a lot of politicians have been telling you the Constitution should be amended to give them more power and have been promising you a lot of things for the liberty they want you to give up. Well, that is what Hitler said too, but I don't want that kind of a bargain. I want no politician as my nurse-maid. I want none of his brain-trust planning me and my life and, if you knew politicians and brain-trusters as I do, neither would you.

"And, if you didn't have a Constitution to control them and a Court to enforce that Constitution, their power would be unlimited once they got in office. They wouldn't even have to run for re-election if they didn't want to. Then your only way to get rid of them would be revolt just as it was the only way Washington and Jefferson had.

"Whenever any politician says to you, 'I want more power' and makes a lot of promises about what he will do for you if you give it to him, think of what has happened in Russia, Germany and Spain and ask yourself, 'What does he really want to do to me?'"

# Orange Growers Profit By X-Ray Inspection

A NEW electrical service this spring saved money for growers and gave consumers a finer product, when X-Ray machines were used commercially for the first time to inspect oranges. The result of 18 months research by the California Fruit Growers' Exchange and the General Electric X-Ray Corp., the new machine is economical and simple, and will permit 4 persons, without guesswork, to inspect at least 1½ carloads of oranges per day.

The machine came into use at a critical time, permitting California packing houses to segregate fruit which had been damaged by this winter's freeze. Operators, observing the shadows of oranges cast on fluoroscopic screens, are able to judge fruit for immaturity, low sugar content, granulation, and, in fact, any condition causing a breakdown of fruit cells. Although not sensitive to alternaria rot in lemons, the machine will detect internal decline.

About 1,200 watts is drawn by each machine, half for the operation of the tube and the remainder for motors. Nearly 200 machines are expected to be in operation in California Sunkist packing houses alone by the opening of the valencia season.

Among the early advocates of such a device was D. W. Tubbs, agricultural commissioner of Orange County, Calif. Despite the skepticism of fruit packing men, the machine has finally proved its value following the long experimental period in which H. J. Ramsey, field department manager for the exchange, was actively interested.

It has finally emerged as a simple device of rectangular shape, on each side of which sit two operators who observe the projected shadows of oranges which are conducted past the X-Ray on two conveyor belts.

The 12-inch tube is located in a steel case at the bottom of the machine. The X-Rays are projected upward through an opening about the size of a pint milk bottle bottom. The fluoroscopic screens, set above the conveyors, are observed through ¼-inch glass, leaded to 57 per cent, mounted at 45 deg. Lead armour ⅛ in. thick is considerably heavier than that required by law. Escape of X-Rays through the ends of the orange tunnels is prevented by curtains of lead-coated rubber.

Speed variation is provided for the motor which drives the conveyor belt, so that operation can be speeded up to match the skill of the inspectors. Two other motors are used in a cooling system for the tubes. One provides circulation of oil around the submerged tube, while the second causes the excess heat to be exhausted in an air stream created by a small blower.

Cost of operation, according to Mr. Ramsey, is expected to be no more than 12c per hour. Biggest item is the tube itself. Costing about $150, and lasting for 1,500 hrs., it depreciates at the rate of 10c per hr. The 1,200-watt demand can be supplied in California at the rate of from 1 to 2 cents per hr. Service is standard 220-volt, transformed to the 100,000 volts required by the tube.

Operators determine the quality of the fruit by the contrast of light and dark. Good fruit with heavy juice absorbs X-Rays and appears dark. When a light fruit appears, the operator touches a manually operated ejector which transfers the imperfect fruit to a third belt.

Big advantages of the machine are that it permits the operator to see conditions clear to the center of the fruit, and avoids the loss of physical cutting. Besides speeding up inspection, it improves its quality. Even the most careful grader cannot help passing some affected fruit and occasionally rejecting some which is perfectly sound.

Although the machine at present finds widespread application only in the citrus packing sheds, a variety of other uses are foreseen. The device already has been applied to the inspection of figs and the grading of English walnuts.

Experienced fruit packers say that the estimate of 1½ cars of fruit per day per machine is conservative since operators have not yet become highly skilled. It is expected that progressively faster inspection will be possible.

Oranges being inspected with an X-ray machine. Leaded rubber curtains prevent stray of rays. Manual bad-fruit ejectors and conveyor-speed controls are at the operators' fingertips

# Drainage by Pumping Improves Soil

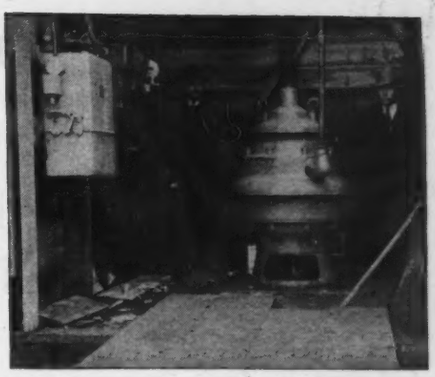
By BEN W. FABER
Portland General Electric Co., Hillsboro, Ore.

Development of irrigation and drainage load in the Northwest is gradually assuming importance as agriculturalists recognize the possibilities of increasing production or improving quality of their crops. A noteworthy drainage installation which is typical of possible applications in this region recently has been completed at Wapato Lake near Gaston, Ore.

Wapato Lake bed has been reclaimed by the erection of a dike enclosing 750 acres. The level of the lake bed is 2 ft. below the level of the Tualatin River when the stream is at its low stage and 15 ft. below when the stream is at flood. The new pumping plant is designed to provide adequate drainage at all times. A 75-hp. vertical 2,200-volt linestart motor is direct connected to a Pomona pump. With the river at flood stage the pump can move 15,000 g.p.m. while at low stage 22,000 g.p.m. can be handled. A float switch in the drainage sump automatically controls the motor.

Soil at Wapato Lake is extremely rich, producing record crops of celery, onions and potatoes. Last season one 6-acre plot produced 2,140 sacks of potatoes which brought the grower $2 per sack.

The new pump replaces an older and smaller installation which was not efficient. The installation will be used to control the moisture content of the soil during the growing season. Water will be admitted to the lake bed from the river as needed and any excess will be removed by the pump.



Modern drainage installation at Wapato Lake where a 75-hp. motor operates a 15,000 g.p.m. pump

# Electricity Tests Seed Germination Standards

GERMINATION tests on seeds which are used in determining standards and price, can be conducted under ideal conditions as the result of new equipment installed in the State Seed Laboratory of Idaho. The installation, which was made by the Idaho Power Co., consists of a four-door, restaurant size G-E cabinet model CS-270 refrigerator, equipped with automatic control for heat, cold and humidity. It assures the exact control necessary to provide the varying kinds of sprouting conditions essential for different varieties of seeds.

Purpose of the State Seed Laboratory is to provide growers with certificates of viability or percentage of germination of seed samples. These are the basis of bargaining between growers and seedmen. All vegetable and flower seeds are grown under contract and payment is not made until tests prove that the seeds meet the stipulations set down by the seedsmen.

Climatic conditions in the early fall in various sections of Idaho are not conducive to germination of newly threshed seeds. Many varieties require over-ripening before they will germinate and this over-ripening process necessitates low temperatures. Dormancy in lettuce seed is frequently difficult to break. The new equipment installed provides the laboratory with a germinator which permits any combination of humidity and temperature necessary to assure proper germination. It also greatly increases the capacity of the laboratory and insures quicker testing service.

Idaho is becoming increasingly important as a seed production region. Disease-free virgin soil plus proper climatic conditions are necessary for the production of blight-resistant seeds. Alfalfa, clover, carrot, lettuce, onion and flower seeds are being grown in increasing quantities. During the last two seasons the Boise River Valley produced 250,000 lb. of fancy onion seeds of different varieties. These brought the grower betwen 35 and 40 cents per pound, with an average yield of 500 lb. per acre.

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EDISON FARM NEWS, a new publication of the Southern California Edison Co., made its appearance in April. The four-page illustrated magazine is a companion piece to the Edison company's *Electrical Times*, a consumer magazine which reaches more than 325,000 domestic customers each month. Popularity of farm features, formerly carried as part of *Electrical Times*, led to the new publication. It will be distributed to 75,000 rural customers with the monthly bills. Rural customers will continue to receive *Electrical Times* with its domestic, commercial and industrial stories and pictures.

●

TO ADVERTISE the advantages of the electric brooder, Pacific Power & Light Co. has displayed in windows of its district offices a specially constructed brooder with a glass top. Live chicks were placed within to demonstrate the readiness with which they became accustomed to brooder life. The special brooder was constructed by Odes Sloan, rural representative of the company, using the new Lyons forced air circulation heating units. High customer interest is reported.

●

WALNUTS in San Ramon Valley, Calif., are being given frost protection with machines of 150-hp. capacity. One large ranch is considering installation of ten, with a total connected load of 1,500 hp.

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RURAL ELECTRIFICATION PROBLEMS will be discussed at a meeting of the California Committee on the Relation of Electricity to Agriculture scheduled for San Francisco, May 28.

●

AN ELECTRIC PIG BROODER employing a 150-watt lamp in a standard 12-in. RLM reflector as a source of heat has been successfully tried out by the argicultural engineering department of the College of Agriculture of the University of California.

## Contractors Law Being Strengthened Butcher Tells Convention

DISTINGUISHED by a visit from Laurence W. Davis, executive manager of the National Electrical Contractors Assn., and filled with subjects of vital importance to the contracting business, the semi-annual meeting of the Electrical Contractors Assn. of Northern California, held at Fresno, April 10, was particularly significant. The problem relative to continuance as a chapter of the N. E. C. A., precipitated when the national dues were revised on a sliding scale basis, was uppermost among association matters under discussion. The changes in the Contractors License Law, as described by Roy M. Butcher, San Jose electrical contractor and chairman of the Contractors License board, was the leading item of importance outside the internal affairs of the association.

Frank Boyd, Pacific Electric Motor Co., Oakland, president of the chapter, opened the one day convention with reports from important committees. Del O'Connor, Lupen & Hawley, Sacramento, chairman of the legislative committee, described the formation of the Construction Industry Council at Fresno, and of its work to sponsor the changes and improvements in the Contractors License Law. Ed Martin, Sterling Electric Co., San Francisco, secretary and chairman of the industry relations committee, spoke of the support given the utilities in recent elections proposing municipal ownership. He pointed out the helpless position of the electrical contractor in cities where the competition between municipal and private utilities caught the contractor in the "no man's land" between both.

Whether a firm should organize as a partnership or as a corporation was very thoroughly analyzed by J. R. Lazarus, attorney of Fresno and head of its Better Business Bureau. The problem arises as a result of the exceedingly heavy and duplicating taxes placed both on corporations and their officers. Partnerships, he pointed out, in spite of their advantages in taxation, have a large number of disadvantages. Death, or disagreement with a partner, or the private actions of a partner entirely outside the partnership, were all shown to present liabilities that must be balanced carefully against the advantages.

To pay the huge government expenditures for relief and made work, Mr. Lazarus pointed out, business men must face increasing taxes and the introduction of the new silent partner, the Bureau of Internal Revenue, in all of their business transactions.

Dan Bronson, reporting on the Federal Trade Commission orders to cease and desist issued to electrical manufacturers alleged to have fixed prices on cable, wire, and prime movers, pointed to the need for contractors associations to avoid collusive schemes. It was likewise noted that manufacturers protected themselves for profit and that while contractors are often accused of making wiring costs high, manufacturer price maintenance by agreement is ignored by the complainants.

Roy Butcher, reporting on the Contractors License Act told of proposed amendments which would lower the exemption from $200 to $50, remove agricultural exemptions to a large extent, give the board the power to direct the registrar to enforce business prequalification, strengthen the clauses relating to diversion of funds, and provide that the attorney general shall defend inspectors in cases involving enforcement of the law. He announced that the board would publish and circulate to all registered contractors a quarterly bulletin giving interpretations, results of cases, and news regarding enforcement of the law.

Setting forth the principle that profitable industry is in the public interest, Mr. Butcher said the policy of the board was that each man had a right to earn a living. If a contractor does not get for his work his true cost and a reasonable profit, he maintained, that contractor is denying other contractors their constitutional right to earn a living. Approval of that principle was voted unanimously by the meeting.

Louis Douat, Buzzell Electric Works, San Francisco, opened the afternoon session with a discussion of labor costs and charges. Increased costs due to social security payments and accounting were discussed. A committee to study just what charges are applicable to labor costs and to make suggestions to the membership was voted.

Preliminary to introducing Mr. Davis, Frank Boyd explained the problem arising from the increase in national dues, now based on volume of business done. Whether the members were getting their money's worth for such membership had been asked.

Laurence Davis, speaking for Earl Peak, N. E. C. A. president who had planned to attend the meeting but could not because of pressing business, told of the basic reasons for the new dues. He recalled the former publication of a magazine, of its support by advertising, of the implied obligation carried by the acceptance of advertising, and of the sale of the magazine. He explained that the association for several years had been carried on the income from that sale.

Mr. Davis then spoke of what the association meant to contractors in an age when business has become increasingly complex, increasingly interrelated with other groups and branches of industry, each themselves strongly organized. Individually, he showed, the contractor, independent as he might feel, was almost helpless to deal with organized groups, groups which have pressures of competition from industries entirely foreign to the electrical industry to cope with. He told of experience under NRA, and of future government policy along lines of voluntary regulation of business by its own groups. Contracting, lacking organization, would not be able to take advantage of such situations.

The N. E. C. A. voluntary agreement, he said, was such a method of self regulation, made money for its members, and had what no other type of regulation provided—it rendered better service to the public. He told how Earl Peak's reversal of the N. E. C. A. policy from one of militancy to one of constructive cooperation has restored the respect of other branches of the industry for contractors and had opened the closed door of negotiation to contractors that they might resume ways to improve the business for contractors with industry support.

He concluded by telling of plans for bringing special trains of contractors to California for the N. E. C. A. convention in Los Angeles in October.

After some discussion the matter of national dues and chapter status was referred back to the excutive committee to recommend some solution for the problem to members.

A. L. Stone, Stone Electric Supply Co., Los Angeles, president of the Los Angeles association and Pacific Division member of the N. E. C. A. executive committee, told of elaborate plans under way to entertain the national convention in October. He enlarged on the details of the tour of the special train from Chicago. It will stop at Grand Canyon, Boulder Dam, and after the convention in Los Angeles will visit Yosemite, San Francisco, Portland, Seattle and Spokane. One day of the convention will be devoted entirely to contractors' closed sessions. At the other sessions papers and addresses will generally be limited to men in the contracting branch of the industry. Entertainment for the ladies will be most complete, including a trip to the movie studios, a trip to Catalina, a visit through the orange groves with a luncheon at Riverside's Mission Inn. (More details of convention plans will be reported in succeeding issues.)

J. O. Case, president of the Southern California Chapter, spoke briefly, citing his experience on the examining board in Los Angeles with the number of totally unfit applicants for contractors licenses.

Seth Cohn of San Mateo invited the northern California association to hold its next meeting in San Mateo, which was voted. It will be held in early December, after the national convention. Unanimous too was the vote of gratitude to the Fresno electrical contractors local association for the fine hospitality and excellent publicity given the meeting.

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## Larry Davis Completes Western Contractor Tour

LEAVING New York April 4 and not returning until early in May, Laurence W. Davis, manager, National Electrical Contractors Assn., made a complete swing of Western cities last month. "Pinch hitting" for Earl Peak, president of N.E.C.A., who at the last minute found it impossible to make the trip, Mr. Davis made his first trip to the West in 7 years. He was received enthusiastically by groups of contractors in every city he visited. He was likewise booked to speak to industry gatherings and to meet with Industry Coordination Committees and other industry groups in which the contractors play a part.

Mr. Davis' first point of contact was San Francisco, April 7, attending the San Francisco association meeting April 8. He was the featured speaker of the northern California association convention at Fresno April 10. In Los Angeles April 11 he addressed the Electric Club, and a contractors' meeting of the Southern California Chapter, N.E.C.A., that same evening. April 12 he addressed San Diego contractors in an evening meeting. April 13, after meeting with the directors of the Electrical Development League and the Industry Coordinating Committee, he talked to a group of Orange belt contractors at Pomona. April 15 he attended the Electrical Estimators' meeting and returned to San Francisco April 16 for an industry meeting that night.

Portland he reached by April 19, where meetings with industry and contractors followed. April 21 to 22 he was in Seattle and April 23 he visited Vancouver, B.C. His return trip was made through Spokane, where he stopped April 26, and Salt Lake City, where he stayed from April 27 to 29. From there he went to Denver, intending to finish up his western tour May 2.

In his contractors' meetings, Mr. Davis brought an intimate picture of the working of the national association. He illustrated the results of N.R.A. upon business and read indications in public statements of administration leaders that a trend toward more self-regulation of business by those in that business was inevitable. Association organization, he pointed out, was the way in which to take advantage of that trend. He told of the progress under the new policy enunciated by Earl Peak and announced to the electrical industry last year. Industry promotion committees have been set up in various communities throughout the country to deal constructively with the business development needs of the industry. This program, he said, has rebuilt confidence and respect for the electrical contractors and reopened a door which had been previously closed because of a militant and critical attitude on the part of the association.

Several of the geratest problems facing contractors he discussed in detail. First was that of promoting adequate wiring. The second was that of correcting bad competitive practices.

"When a man goes into business the world doesn't owe him a living. He can't expect protection of that sort. You invited yourself into business to perform a service for the public and to sell that service for a profit," he said, as he elaborated upon the voluntary agreement type of regulation which, he said, preserves the public interest and provides a means of self-discipline for the signers of the agreement.

The rewards of association effort, he declared, came both on a cold-blooded business basis and on a basis of warm association and development of better human relationships.

## Variety Features Cal-Tech Program of Inspectors Assn.

ASIDE from the two talks given by members of the California Institute of Technology faculty; one by Dr. Roval W. Sorensen, describing the World Power Conference; the other by Dr. Robert T. Knapp, on soil conservation work for the U. S. government; the discussion at the March bimonthly meeting of the Southern California Chapter, International Assn. of Electrical Inspectors, covered everything from neon soup sign to locknuts. Cal-Tech again provided the auditorium for the 63 in attendance. Fred Vore, city electrician, Pasadena, was host, and G. E. Price, Orange County inspector, presided as chairman.

Otis Newcomb, Long Beach, told of a restraining order against his city's licensing ordinance, resulting in suggestions from the court for several changes in reference to number of helpers to journeymen. Mr. Newcomb later invited the chapter to hold its next meeting in Long Beach, May 19, which was unanimously approved.

Frank McMahon, Pomona, revealed that where city inspectors have no jurisdiction over street lighting installations life hazards have been discovered. It was upheld by others that such jurisdiction should be granted.

Sprinkler heads located near switchboards drew comment, and Jay DeVoe, electrical engineer, Board of Fire Underwriters, Los Angeles, suggested special requests to the board that sprinkler heads be removed from near switchboards or provided with a baffle plate. Grounding to a sprinkler system was also declared taboo.

Trailer camp problems were again discussed. Chairman Price referred to California Safety Orders for direction, and suggested that trailers be parked in stalls and fed from underground.

Harry V. Dobson, Santa Barbara, presented copies of a table for determining outlet box capacities and methods of figuring the cubic measurements of fittings and splices.

Neon signs using labeled transformers but running high voltage leads in glass tubing were discussed following comments by Mr. Newcomb. Recommendations in the current edition of the National Electrical Code were suggested as answering this problem.

Unable to report on the meeting of the Electrical Committee at Atlantic City which he attended, R. H. Manahan, because of a cold, postponed his report until the May meeting.

Secretary Herbert Ufer read a letter from Victor Tousley defining the types of service equipment listed.

# EDITORIAL

## Exploding Half Truths

WITH due regard to the verity of the homely adage about arguing with members of the mammalian family *mephitis mephitis*, we cannot refrain from calling attention to a glaring example of that type of journalism known professionally as "colored," but more aptly described for the sake of politeness as "half truth." Essential weapon of the propagandist, whether journalistic or political, these half truths frequently defy logical rebuttal and are seldom challenged. Here is a sample quoted from a recent editorial in the Sacramento *Bee*:

At a meeting of the Northwest Electric Light and Power Association in Salt Lake City the privately owned public utilities were urged to remove the "veil of mystery" that is now draped over utility operations.

The reason? The growth of public ownership in all sections of the country. Said George M. Gadsby, president of the association: "Our fears of 1927 are the realities of 1937."

This is interesting; but even more significant was the statement of George C. Tenney of San Francisco, editor of the Electrical West. Pointing out there are more federal projects in the Northwestern states than in any other section, he added: "Washington, Oregon and Idaho, in that order, enjoy the lowest residential lighting rates in America."

A great many municipal utility projects also are in operation throughout the Northwest. These, plus the federal projects, have brought the low residential lighting costs.

The whole tone of the conference showed clearly which way the wind is blowing in the public utility business. There is no "veil of mystery" about the steady advance of public ownership.

By selecting a single sentence from a thirty-minute talk by the editor of ELECTRICAL WEST, the *Bee* makes out a case for public ownership, and by innuendo, indicates that the people of California suffer by comparison with their brethren to the north. What are the facts? Speaking on "The Challenge to Commercial Departments from Federal Development of Power," this editor said:

There has been a mistake in the title assigned to me. It might do if this talk was being made to a group of commercial men in some other section of the country. But for you whose record of salesmanship has created such high customer use with resultant low rates, the title should be changed. It should read "The Challenge of Utility Commercial Departments to Federal Power Projects in the Northwest." For sincerely, your record does constitute a challenge to these projects. The Federal Power Commission's rate studies bear this out. Which states lead all others with the lowest average domestic rates? Washington, Oregon and Idaho in that order, with Montana and Utah also in the first ten. Who and what accomplished this? You men with your sales organizations which have taken the comforts, conveniences and luxuries of electric service into tens of thousands of homes, building the high use which in turn brings low rates.

Thus a tribute to the zealousness and hard work of utility commercial men, by specious argument, becomes a reason for public power! And why did the *Bee* fail to mention that California ranks fourth among all states in the U. S. for low domestic rates? Because half truths cleverly used can create prejudice and misunderstanding.

This case is cited in detail because if in this instance facts have been misrepresented and mis-interpreted, what about other arguments presented by a prejudiced press in support of its pet theories? Isn't it barely possible that equal liberties are taken with other quotations and other authorities to win public opinion to partisan doctrines? Public faith in the plausibility of biased news organs can be shaken when those who must combat their specious arguments know the facts. By employing their tactics a false logician could select his quotations from the Bible and by devious argument and sophistry, prove that the devil was the Lord of all creation.

## REA Recognizes a Fact

SIGNIFICANT and interesting is an item from ELECTRICAL WEST's Washington, D. C., correspondent: "Allotments approved by the REA are now including an allowance for load-building promotional activities during the construction period and the early stages of operation, usually covering 18 months. No definite formula has been adopted, the amount of the allowance being considered separately for each project. It is felt that the economic stability of the new lines will be materially enhanced by making a provision for stimulating intensive use of the new facilities at the earliest possible stage."

Government recognition of the necessity for expending reasonable sums of money for creative selling should quiet those critics of the utilities who have questioned new business expenses. It is apparent that the REA feels that rural customers must be in a position to use considerable amounts of electric energy if the extensions financed by government money are to be self-sustaining. Low cost rural lines alone will not accomplish this. Low rates of themselves will not do it. The farm customer must be sold on the benefits which he will get from every possible electric use. This requires money and man power. If the REA farm customer were simply to install lights and a radio, which experience shows is the usual initial use of a new customer, the lines would never pay out or the rates charged would be prohibitive.

Excluding those Western rural customers whose electrical usage is not distorted by heavy irrigation pumping, the average farm use in this region ranges between 2,000 and 3,000 kw.-hr. annually. This high

degree of use did not come in a month or in a year. It represents the cumulative effort of countless man hours of salesmanship. One Pacific Coast power company with 9,000 farm customers has 14 farm service men whose work it is to visit every rural customer and counsel them on how electric service will decrease labor, increase production, improve products, save time or money, promote greater efficiency or make farm life healthier and happier.

We repeat that the mere availability of power will not accomplish any of these. Nor will low rates. The farmer must be shown—must be sold—on the fact that electrical equipment plus electric service will give him some or all of these advantages. This requires load-building promotion. And the same reasoning applies to every class of electrical customer. It should give the utilities a feeling of satisfaction to know that the REA finally has recognized a fact that the industry learned from long experience.

## The Bath Room Heater

TO THE INDUSTRY it is "a natural." To the public it means the most satisfactory use of electricity. To the builder it is a selling feature as good as the purple plumbing itself. To the architect it is a thoughtful note which will earn him lifelong gratitude. To the wiring contractor it is an additional circuit. To the wholesaler it means more supplies. To the manufacturer it means more products sold—directly and indirectly as a result of the satisfaction which this device will give. To the utility it is a load-builder that nobody will object to paying for. In fact to everyone, in and out of the industry, the bath room electric heater, permanently installed and switched for convenience and safety, is an example of electricity's finest service.

Even the "Roman riders," those companies who actively sell gas for heating and cooking can endorse the electric bathroom heater enthusiastically. A bath room is no place for an individual gas heater for several reasons. And even if it is piped with a register from the general heating system there are many days and nights when the heating system is not desired but heat in a bath room is. Because a person is unclothed there is need for additional heat, above that which is sufficient for the house itself. In emergencies at night during illness the bathroom heater brings a comfort which cannot be priced in monetary terms.

So many new homes are being built today. It is a crime of neglect against the future occupants of every one of those houses if an earnest effort is not made to sell them a bathroom electric heater. Let everyone in every branch of this industry, in all of his or her contacts with people, talk enthusiastically of this most satisfactory of all electric services to the home. Let it become as customary to install an electric heater in a bathroom as it is to install a bath tub or other indispensables.

Goodwill builder, full money's worth, clean, healthy, safe, sane, and so convenient—hail the electric bathroom heater!

## Hard Up Legislation

UTOPIA comes high. The brainstorms of social cure-alls are proving hard to finance, even if they are easy to conceive. Consequently the legislative sessions of states and national capitals are incubating every sort of tax and revenue dodge that the ingenuity of a desperate creditor can concoct. Failing to leech enough revenue from the ordinary forms of taxation, they are not adverse to polite forms of racketeering to tap more funds with which to finance expenditures which will dramatize them as great friends of the common people.

Into such a category is the latest wheeze—a tax on national trade marks in state sales. If this is enacted the owner of a long established trade mark runs a double risk. He faces a tax on anything bearing that trade mark sold in the state, which discriminates against his product. And he faces the possibility of a racketeer beating him to a state registry of his own trade mark as a hold up for a price to do business under his own name.

All such parasitic tax measures sap the life blood of business. They do the public an insidious injury, for the public ultimately pays. If permitted to grow, sooner or later the fungus will kill the tree.

## Outstanding Opportunity

FACTS revealed in a survey of electric range and water heater load development here in the West published in the last issue might have lead to the conclusion that a noteworthy job has been accomplished. In comparison with other sections of the country such a conclusion is justified. When the figures are interpreted in the light of the opinions of the two or three score experts whose ideas accompanied the survey, they present an entirely different meaning. Noteworthy accomplishment becomes instead an outstanding opportunity. These men are future possibilities for greater sales and load and offered suggestions as to how to do the job. They pointed to the increasing ability of the public to buy, to the sterling values which the industry has to offer —more and more utility and beauty built into the merchandise without increasing its price. They asked for better trained manpower and more intensified promotion. They urged the industry itself to use its own products and service. They believed that the range and water heater business is now ready and ripe for vast expansion. And the figures bore them out.

# Maintenance Engineers

AN IDEA, METHOD, AND NEWS EXCHANGE, WRITTEN BY AND DESIGNED FOR PLANT ENGINEERS

## Short Enlists Maintenance Men In Safety Engineering

THAT the plant electrical maintenance engineer in reality is working for the same purposes as the Industrial Accident Commission of the state and hence is in a sense assistant to the engineers employed by the state to supervise safe installation, was the point made by Frank A. Short, electrical engineer for the commission at the April 20 meeting of the Electrical Maintenance Engineers Assn. of Southern California. Mr. Short told of the fine cooperation he had received from maintenance engineers and told how they could get the maximum of service from the commission's staff. He did not go into any of the details of the State of California Electrical Safety Orders but illustrated how information relative to them could be obtained quickly from his office.

Entertainment, with more than a little instruction, was furnished by Chief of Police James E. Davis, who talked on the activities of the police department for the protection of persons and industries in Los Angeles. He outlined a number of investigations which had uncovered that much of the present labor agitation was being initiated behind the scenes by communistic organizations and told what his department was doing to cope with the situation.

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General Electric Co. will stage the next meeting of the E.M.E.A. with a program devoted to light sources and lighting practices, under the direction of E. P. Markee, manager of that division for the Incandescent Lamp Dept. The meeting will be on May 18.

### A New Service

**Industrially the West is progressing rapidly. With this progress has come an increased need for maintenance engineering and for men trained and equipped to take care of the maintenance requirements of industrial and commercial establishments. In a rapidly developing art like electricity the man who would keep abreast of new practices, new methods, economies, and progress in equipment design has need of a source of fresh and accurate information and experience. One of the best means for such exchange of information and experience is the Electrical Maintenance Engineers Assn., of which that in Southern California is the first in the West. But even such associations have need for a medium for the interchange of the ideas and methods that are developed by its committees, meetings, or individual members. It is to provide just such a medium of exchange of data, ideas, methods, practices, economies, and news for western maintenance engineers that *Electrical West*, in cooperation with the southern California E.M.E.A. inaugurates this new department. Its scope will be that of the entire West. Its material will be drawn from western experience and intended to fit western conditions. The participation of every reader is not only warmly invited but vitally necessary to make this the medium of interchange that will benefit its readers most.**

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Three other office buildings have been contacted and will work with the committee in a similar manner. Building managers' associations have taken an interest in the project. An analytical study will be made to obtain cost figures of fixtures, wiring, and repainting that can be used to advantage in the office buildings of Los Angeles.

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AIR CONDITIONING groups in northern and southern California are assisting in the sponsorship of an investigation into cooling towers by the University of California. Joining with the American Society of Heating and Ventilating Engineers, the three groups will finance the investigation to determine the fundamental laws governing the operation of natural and forced draft cooling towers and evaporative condensers. The work is under the direction of Dr. B. M. Woods, of the physics department. Both the Los Angeles and San Francisco air conditioning societies are contributing to the promotion fund for the investigation.

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ENLARGED RESALE INFORMATION service is being offered to electrical contractor-dealers by the Biddle Trade Bureau, 335 Rowan Bldg., Los Angeles. Biddle Trade Bureau for some years has been offering a pocket-size electrical resale information book known to the trade as "the Red Book." Demand of subscribers for an enlarged service brought forth the new service. More detailed information about products, comparative catalog numbers of leading brands, detailed descriptions enabling a dealer to determine the article best suited for specific applications, packing quantities to assist in intelligent and economical buying, quantity discounts to enable costing of job tickets accurately, and more accurate preparation of estimates are included in the new book. The edition contains 400 8½x11-in. pages with index for easy access to information.

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WARNING—To save air conditioning from an epidemic of misleading advertising and sale of equipment which does only part of the job, the air conditioning committee of the Electrical Development League of Southern California in cooperation with the Better Business Bureau of Los Angeles, has been on the air to explain and interpret what air conditioning really is. Taking the Federal Trade Commission's interpretation or definition and that of the air conditioning association as a text broadcasts were made April 19 at 4 p. m. over KFWB, Los Angeles, on Tuesday, April 20, at 1 p. m. over KHJ and ten stations of the Mutual network, and again on KNX Thursday, April 22, at 12:45 p. m. A number of "gyp" jobs claiming to be air conditioned but in reality only partially so were described as examples of misleading practice of which the public must be aware.

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AIR CONDITIONING groups in northern and southern California are assisting in the sponsorship of an investigation into cooling towers by the University of California. Joining with the American Society of Heating and Ventilating Engineers, the three groups will finance the investigation to determine the fundamental laws governing the operation of natural and forced draft cooling towers and evaporative condensers. The work is under the direction of Dr. B. M. Woods, of the physics department. Both the Los Angeles and San Francisco air conditioning societies are contributing to the promotion fund for the investigation.

●

ENLARGED RESALE INFORMATION service is being offered to electrical contractor-dealers by the Biddle Trade Bureau, 335 Rowan Bldg., Los Angeles. Biddle Trade Bureau for some years has been offering a pocket-size electrical resale information book known to the trade as "the Red Book." Demand of subscribers for an enlarged service brought forth the new service. More detailed information about products, comparative catalog numbers of leading brands, detailed descriptions enabling a dealer to determine the article best suited for specific applications, packing quantities to assist in intelligent and economical buying, quantity discounts to enable costing of job tickets accurately, and more accurate preparation of estimates are included in the new book. The edition contains 400 8½x11-in. pages with index for easy access to information.

# Coast Counties Lights Up

## So That the Trade May Use Its New Quarters As Examples of What Good Lighting Will Do For Other Offices and Stores

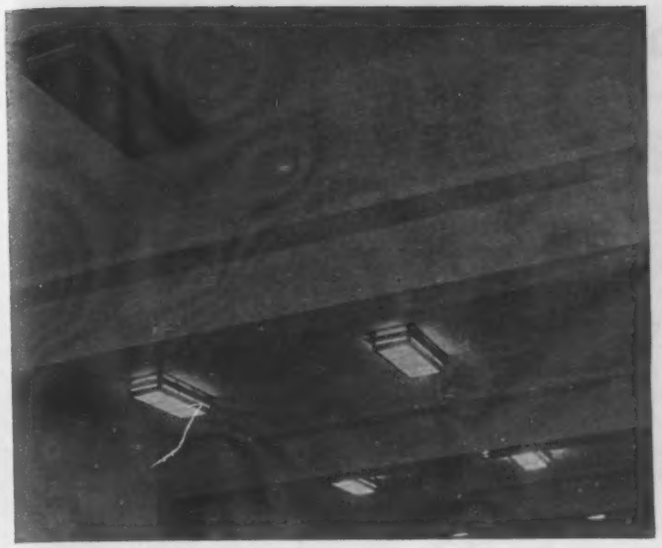
At night a 3-color modernistic, slow-cycle flashing neon sign, blue and amber (Elect. Prod. Corp.) and 200 ft. candle windows of 200-watt Holophane reflectors on 16-in. centers, make it Santa Cruz' brightest spot

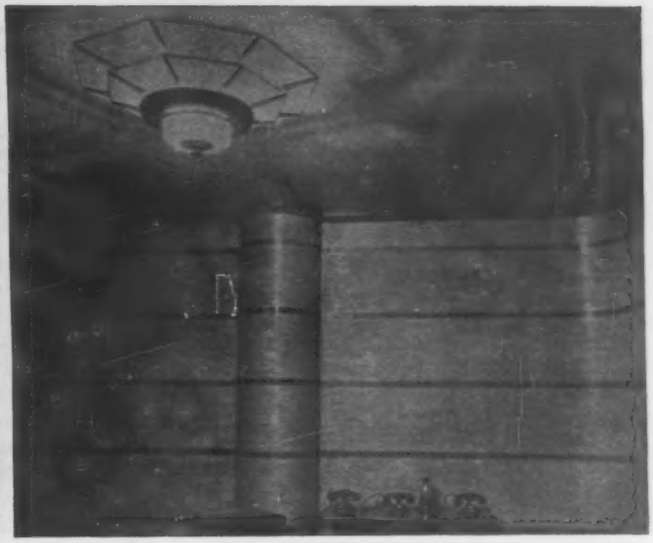
Above: Accounting room, completely enclosed, without windows or skylight, electrically ventilated, and lighted by 13 300-watt ceiling type Holophane Filterlite units equipped with porcelain base. Similar units are used in the drafting room, gas and electric superintendents' offices, and suspended from the high ceiling in the assembly room. The assembly room will later have an electric display kitchen installed

Below: Better sight light selection fitting room, located on the main appliance floor and presided over by a floor hostess who assists customers to select the level of illumination they individually prefer

Above: Santa Cruz district manager's office, just off the main floor, equipped with 500-watt Holophane Realite fixture, producing 35 ft. candles at the desk

Below: Main floor pay office and display floor, lighted by 24 stainless steel trim ceiling boxes (described next page). Units are controlled from a Nofuze panel, either manually or in any preset combination on a time switch. Intensity, 40 ft. candles



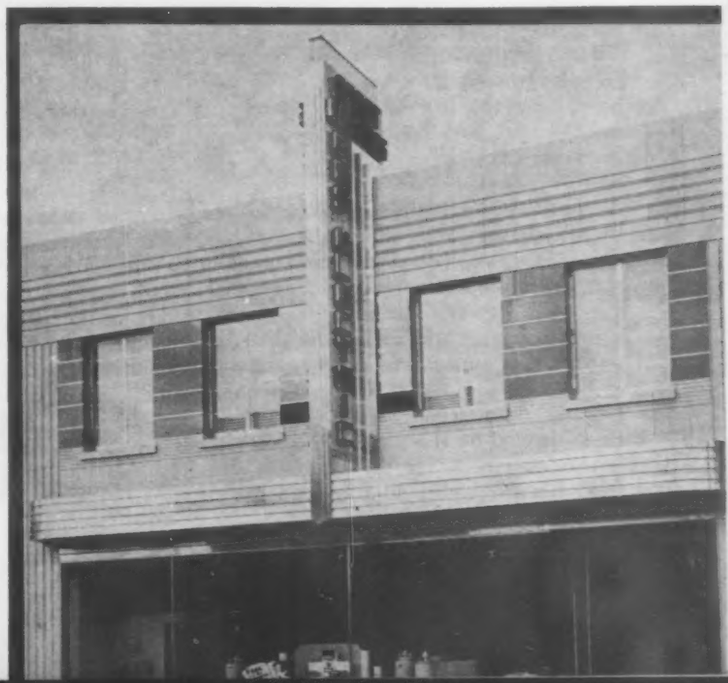


Above: Ceiling boxes of main floor office are stainless steel, contain 3 300-watt Holophane units with control lens. Spill light illumines flashed opal side panels. Below: Office of A. E. Strong, general superintendent, equipped with 750-watt Westinghouse Magnalux unit, producing 45 ft. candles. Similar units light the offices of Charles Grunsky, chief engineer, and R. N. Dreiman, auditor and treasurer. Purpose of the variety of lighting types is that local contractors may bring prospects to the utility offices and demonstrate recommended lighting. Lighting staff of the company will assist such dealers to sell the better lighting job. In designing the lighting layout Milo Cain, lighting sales engineer, consulted with Robert Dummel, Holophane, Orville Johnson, Graybar, and K. K. Knopf, Westinghouse

Above, right: Conference room of H. L. Farrar, president; wood panelled walls, lighted by a special fixture made by Preston Hopkins, containing 1000 watts of incandescent and a 400-watt mercury vapor lamp. Intensity is 25 ft. candles

Above: Original idea in office lighting in the office of H. W. Edmund, sales manager; 2 banks of 4 inbuilt Holophane control lens units (200-watt units), one over each window, concentrate 50 ft. candles on the desk. Three other single units in the ceiling provide 18 ft. candle general lighting

Above: One of several sales department offices, with 500-watt Silvray units; 25 ft. candles. Right: Daytime view of exterior, new Santa Cruz headquarters of Coast Counties Gas & Electric Co., modern in styling and lighting. Santa Cruz district office is on the ground floor



Charles Grunsky engineered the building; Alben Froberg was the architect; Irvin M. Smith, Santa Cruz electrical contractor, made the installation. Service comes in from an alley pole transformer bank, 4 wire, star connected to provide economy in wiring. Of a total connected load of 75 kw. lighting accounts for 64 kw. All panels are Westinghouse Nofuze circuit breaker equipped. Main board was made by Square D. Heating is done by 2 400,000 B.t.u. input electro-gas furnaces, with ventilation and air filtration capacity of 18,000 cu. ft. per min., operated by 2 3-hp. motors. Thermostatic controls are located in the main sales room. Automatic fan switch and automatic control keeps air within predetermined temperature limits. The heating system was designed by Louis Wollenberger, heating sales engineer

# News of the Industry

## CALIFORNIA LAW AIDS PUBLIC POWER

Characterized by its sponsor as the greatest forward step in public ownership taken in California since the turn of the century is the Garrison bill, signed by Governor Frank F. Merriam last month. Principal provision is that cities and counties may issue revenue bonds for public utility purposes upon a majority vote of the people. Two-thirds was previously required. The bill also sets up machinery for establishing public utilities commissions in cities, counties and other subdivisions.

Sponsored by Senator Garrison, Modesto, the bill was passed in both houses of the legislature by strong votes. Governor Merriam said in signing the bill that he was not in accord with the majority vote provision but felt that the support given to the measure indicated that it was the will of the people. It will become law 90 days after adjournment of the legislature.

Acquisition, construction, operation, maintenance, extension, management and control of local public utilities by the revenue bond method are provided for.

Two years ago, Governor Merriam vetoed a simila measure. This year's vote was 38 to 0 in the Senate, 65 to 10 in the Assembly.

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UNANIMOUSLY RECOMMENDED by the California State Senate committee on irrigation March 25, was a constitutional amendment proposing a state board empowered to control water and power resources. This five-man board, appointed for six years by the governor, would have conclusive power to condemn. A finance board would have authority to issue revenue bonds. Political subdivisions would have preferred right to water and energy. If passed by the legislature, the amendment would be submitted to voters in November, 1938.

---

A PROPOSAL TO REDUCE the vote necessary to issue revenue bonds for acquisition of an electric distribution system was defeated in Oroville, Calif., April 12, by a vote of 662 to 595. The measure had the support of two local newspapers, was opposed by the Pacific Gas & Electric Co., which serves the community. Patterned after legislation since enacted by the State of California, it proposed reducing the required vote from two-thirds to a simple majority.

TOTAL CAPACITY of water wheels installed throughout the United States on Jan. 1, 1937, last month was reported as 17,119,610 hp. by the Department of the Interior. The increase during 1936 was 1,040,203 hp. The department estimates that 21 per cent of the nation's water resources are developed.

---

TWO-WAY RADIO will be used by the Northwestern Electric Co. for communication during interruptions to wire communication in storms or other catastrophes and in dredging operations, if an application for license to the Federal Communication Commission is granted.

## U. S. SUES TO HALT S. F. POWER SALE

To compel San Francisco to cancel its agency agreement by which it receives Hetch Hetchy power through facilities of the Pacific Gas & Electric Co. is the purpose of a suit filed in a local federal court by U. S. Attorney H. H. McPike. Preparation of the suit follows failure of San Francisco voters to approve a revenue bond measure for purchase of P. G. & E. facilities, and subsequent decision by Secretary Ickes that San Francisco is violating the Raker Act.

City officials, although anxious for a showdown on the issue, are seeking to forestall an injunction which would impound the $2,225,000 revenue which the city receives from the power company under the agency agreement. They point out that for the city to continue receiving its revenue pending trial, would not harm the government.

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FIRST CONTRACT for actual construction on the Central Valley federal reclamation project in California has received the approval of the Secretary of the Interior. First unit of the project which contemplates extensive power development in northern California will be a part of the Contra Costa canal. The contract will go to Haas, Doughty & Jones, and Marshall & Stacy of San Francisco, on a joint bid of $102,646.

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THE National Resources Committee, reporting to President Roosevelt last month on the California water program, said, "generation of hydroelectric power will be the principal objective of the future development of water resources." It viewed the central valley project as the key undertaking.

## SENATORS INTRODUCE NEW BONNEVILLE BILL

A new bill concerning surplus power from Bonneville was introduced in the Senate last month by four senators from Oregon and Washington. Principal point of difference from the Martin Bill introduced into the House in February is that the new one subjects the proposed Columbia River administrator to the supervisor of the Federal Power Commission in rate matters. The first bill left rates to the administrator's discretion.

Also under the new bill proportion of the project's cost to be allotted to power is to be determined by the F.P.C. It proposes operation of the power house and navigation facilities by Army engineers, who will deliver surplus power to the administrator at the busbar. It provides also that the Senate confirm the appointment of administrator, enlarges the advisory board from three to four, fourth member being appointed by the Secretary of Agriculture, extends the date from 1939 to 1940 until which half the power output shall be reserved for public distributors and cooperatives.

Still undetermined is whether rates shall vary with transmission distance or be uniform. The rate formula is tightened somewhat by the provision that schedules shall be drawn up:

"having regard to the recovery (upon the basis of the application of such rate schedules to the capacity of the electric facilities at Bonneville project) of the cost of producing and transmitting such electric energy, including the amortization of the capital investment over a reasonable period of years."

---

ASSUMING that President Roosevelt's suggestion for a Columbia river administrator to sell Bonneville dam power will be adopted by congress, names are being submitted and the department of interior is reported to be making inquiries as to eligible material.

B. E. Torpen, consulting engineer for Seattle's Ruby dam project, has been recommended by Howard Latourette, Democratic national committeeman. He designed the Bonneville powerhouse and is engineering supervisor of the project. C. C. Hockley, engineer and administrator for PWA in Oregon, also has been proposed.

---

SOUTH BEND, Wash., is considering the proposed purchase of the town's water system, owned by the Puget Sound Power & Light Co., for $75,000.

THERE ARE

*75 Standard Styles and Sizes*

OF MECHANICALLY AND ELECTRICALLY PERFECTED

*The modern method of making a positive connection.*

KEARNEY

# CON-NEC-TITES

*(The Con-Nec-Tite with Patented Full Round Washer)*

*Consider these*

**FEATURES OF KEARNEY CON-NEC-TITES**

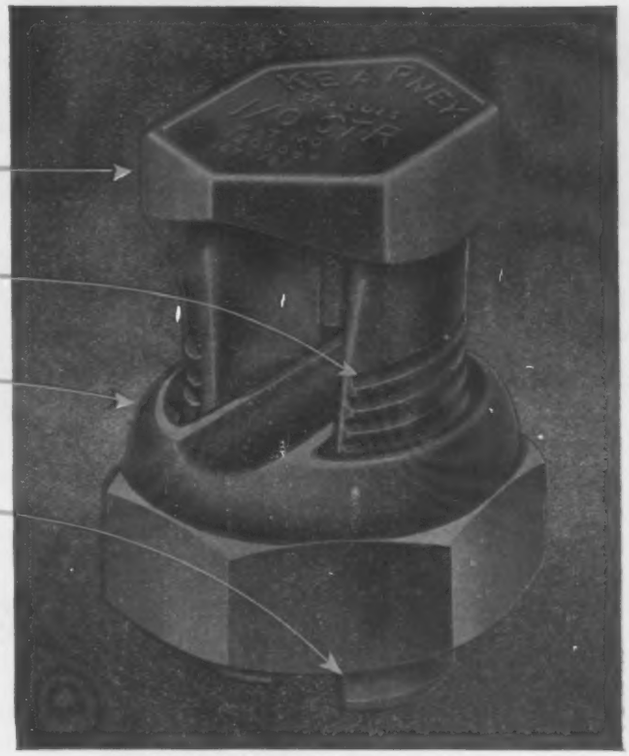
**THE HEAD** — fits securely into a standard hexagonal wrench. Rounded corners of body prevent nicking of conductors.

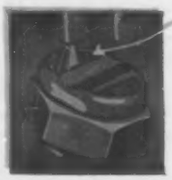
**THE THREADS** — are carefully gauged for pitch and accuracy to assure proper run of the nut and prevent binding.

**THE WASHER** — is a full round washer and gives a smooth, low friction bearing surface; it distributes the load on the nut, and permits maximum pressure between conductors.

**THE PILOT** — is designed to "lead on" the nut; full threads at the bolt ends assure engaging nut properly and prevent cross-threading; full-sized threads throughout the bolt minimize nut friction and give maximum pressure between conductors.

**THE RETAINER** — is an optional feature that is available for those who desire it.





TAKE YOUR CHOICE

*Above is one type of Con-Nec-Tite—Compressed Copper (Cold Drawn Process). Others available are: Large Head and Peanut Head Con-Nec-Tites (Screw Machine Process); Large Cast Con-Nec-Tites (Aluminum Bronze Casting); Telephone Con-Nec-Tites (Copper and Iron); and Compressed Aluminum Con-Nec-Tites (both of the latter Cold Drawn Process).*

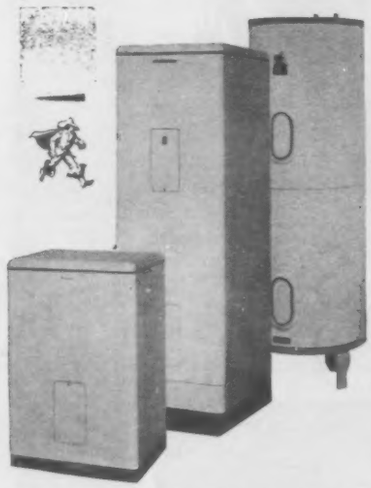
SOLDERLESS CON-NEC-TITES;
T CON-NEC-TITES
LAP-TITE CONNECTORS
TRIP-OUT FUSE SWITCHES;
TRIP-O-LINK FUSE SWITCHES;
TRIP-SAVER FUSE SWITCHES
ONE AND TWO INSULATOR FUSE AND DISCONNECT SWITCHES;
PORCELAIN HOUSED TRIPOMATIC FUSE CUTOUTS;
DOUBLE DUTY FUSE CUTOUTS;
POLE TOP GANG OPERATED SWITCHES;
PORCELAIN HOUSED DISCONNECT SWITCHES;
N. E. M. A. HOOK OPERATED DISCONNECT SWITCHES
FUSE LINKS;
FUSE LINK BOXES;
FUSE PULLERS;
SECONDARY FUSES;
SCREW ANCHORS;
EXPANSION ANCHORS;
FULL-VU GUY GUARDS;
GUY WIRE CLIPS AND STRAND BANDS;
ECONOMY CABLE CLAMPS;
DEAD-END SERVICE CLAMPS;
V-GROOVE SERVICE CLAMPS;
HITEMETERS;
"J" HOOKS;
CONDUIT STRAPS;
ABC SLEEVES AND MACHINES;
CABLE RING SADDLES;
FIT-RITE WIRE HOLDERS;
SLEEVE TWISTERS;
GROUND WIRE CLIPS;
GROUND CLAMP-TITES;
GROUNDING CABLE;
HI-LINE TOOLS AND ACCESSORIES;
CON-NEC-TAP CLAMPS;
GROUNDING SETS;
MASTERBRANCHES.

# KEARNEY PRODUCTS

MAYDWELL AND HARTZELL
INCORPORATED
LOS ANGELES SAN FRANCISCO

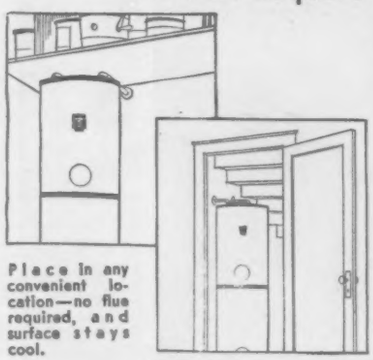
# MODERN HOMES CALL FOR

## Thermador
## Electric Water Heaters



Safe, clean, silent—Thermador Electric Water Heaters are the product of 20 years of progress and specialization in the electric heating field. This manufacturing experience assures many years of dependable, automatic and economical performance from every heater which bears the Thermador name.

### Easily Installed— No Vent Required



Place in any convenient location—no flue required, and surface stays cool.

Thermador Electric Water Heaters are the very best for lasting service with the hard water of the West and are made for that service by water heating specialists in the West.

*"Seven Leagues Ahead"*

## THERMADOR
### Electrical Manufacturing Co.

Factory—2821 East Pico Blvd., Los Angeles
557 Market Street, San Francisco
Builders Exchange, Fresno


## Shotgun Wedding Unites Duo

A "wedding" dinner in Denver last month celebrated the merger of associations to form the Rocky Mountain Electrical League. Here Guy W. Faller, president of the new organization, is receiving the shotgun with which he enforced the ceremony. Harry Adler is making the presentation on behalf of members of the two former organizations, while Gaylord Buck turns his back to such goings-on

## Survey Predicts California Streamflow

California streams will carry a heavy runoff from this month to July, but will display a wide variation in seasonal flow for the October to September period, according to the California Cooperative Snow Survey. Forecasts are based on precipitation data to April 1, for all mountain stations of the U. S. Weather Bureau, states, districts and public utilities.

April to July runoff, determined principally by the snow pack, in per cent of normal, is predicted to be: between 110 and 120 from the Feather south to the Merced, 135 for Kaweah basin, 90 to 95 for Truckee and Tahoe, above normal in Owens Valley.

Seasonal stream flow, determined principally by precipitation, which so far this season is extremely unbalanced, is predicted to be: Feather 57, upper Sacramento 61, Yuba 65, American 74, from the Mokelumne south to the Kern, increasing from normal to 185.

●

CORRECTION—Price of the rate step for most electric cooking on the lines of the Northwestern Electric Co. is 1.8c per kw.-hr. instead of 2c as reported in the tabulation published on page 62 of the April issue of ELECTRICAL WEST.

THE 200-MILE POWER LINE of the Montana Power Co. from Thompson Falls via the Polson power site and through Missoula to Anaconda was completed last month at a cost of $1,600,000. The line carries 100,000 volts to Anaconda and Butte mining and smelting operations.

●

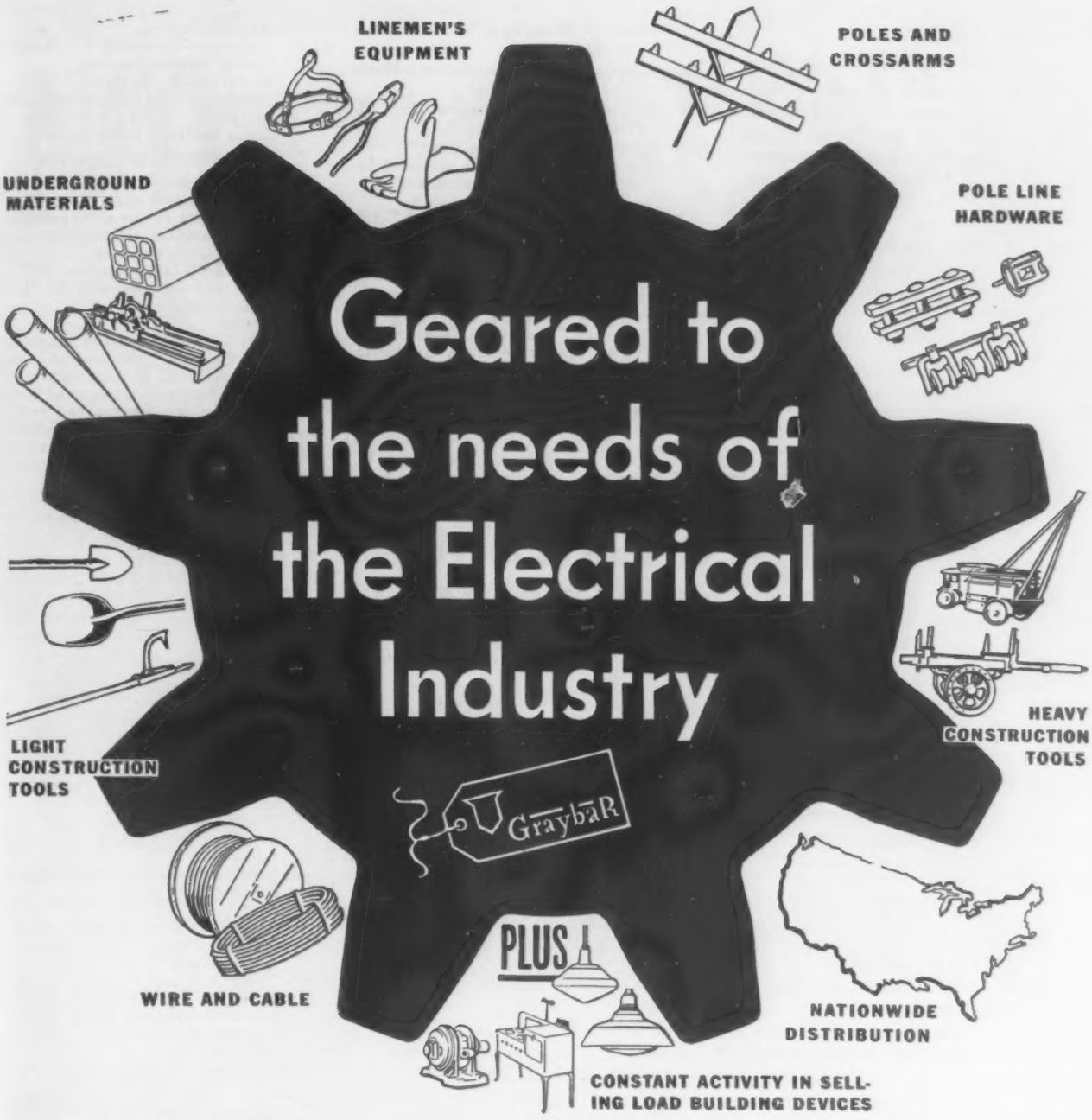
## Washington Water Power Reduces Rates

Voluntary rate reductions in commercial lighting and residential schedules, amounting to $141,000 annually, became effective May 1, on the Washington Water Power Co. system. New schedules were filed at Olympia, Washington, and Boise, Idaho.

This was the fourth voluntary reduction in the past two years, these reductions amounting to $267,000 annually. The new commercial lighting rate in Spokane will be: first 18 kw.-hr., $1; next 82 at 5c; next 300 at 4c; next 1,750 at 3c; excess, 2c. The new Spokane residential rate will be: first 13 kw-hr., 70c; next 22 at 5c; next 105 at 3c; excess at 2c.

●

THE LONGVIEW, WASH., city council is considering purchase of the light and water utilities of the Washington Gas & Electric Co.




**GRAYBAR is uniquely equipped to serve you completely, conveniently, and intelligently. Its 60,000 item service of supply is geared to meet the specialized needs of all branches of the electrical industry . . . Starting in 1869 at the very beginning of electrical development in America, Graybar's experience has kept pace with the growth of the industry. Today, Graybar brings you what you want, when and where you want it. And backs each and every electrical product with a 68 year reputation for quality.**

OFFICES IN 82 PRINCIPAL CITIES: EXECUTIVE OFFICES, GRAYBAR BUILDING, N. Y.

## Complete P.C.E.A. Convention Program

With the exception of two or three addresses by outstanding speakers, the entire program of the Pacific Coast Electrical Association's revived convention at Hotel Huntington, Pasadena, May 20 and 21, falls under the heading of visual education. Dozens of new electrical productions and applications, some of which make their initial public appearance, will be demonstrated.

Here is the final program:

THURSDAY MORNING, MAY 20

8:00 Registration.

9:15 First session in the Ballroom.
Electrical Music by R.C.A. auditorium reproducer.
(Courtesy of Birkel-Richardson Music Company)

9:35 Opening Address—President Fred B. Lewis.

9:50 "Electrical Magic in Industry."
A project in two parts presented by the Operating Economics Section.
A. W. Copley, chairman.
Part 1—"Ramblings in Research." Address and demonstration by Dr. Phillips Thomas, Westinghouse Electric & Manufacturing Co., Pittsburgh.

10:50 Recess.

10:55 Part 2 — "Practical Application of Electronics," Television, Motion Pictures, Theater Dimmers, Automatic Steering for Ships.

11:50 Annual Meeting.

12:15 Luncheon—Sponsored by Administrative Services Section.
R. E. Fisher, chairman.
Speaker, E. F. McNaughton, director of public utility department, California Railroad Commission.

THURSDAY AFTERNOON

Vice-President D. E. Harris, chairman.

2:00 "Light Sources and Illumination."
A project in two parts presented by the Business Development Section.
A. H. Nicoll, chairman.
Part 1—"Light Marches On." Address and demonstration by H. Freeman Barnes.

3:05 Recess.

3:10 Part 2—"New Means to Bigger Lighting Business." Address and demonstration by H. H. Magdsick.
Mr. Barnes is manager of the sales promotion department and Mr. Magdsick is commercial lighting engineer—both of the Incandescent Lamp Dept., General Electric Co., Nela Park.

4:15 "Electrical Magic in Agriculture." Address and demonstration by Joe K. Ellsworth, University of California, Berkeley.

THURSDAY EVENING

8:00 "A Wiring Clinic." Special meeting of the Business Development Section in the Ballroom. All delegates welcome.

FRIDAY MORNING, MAY 21

Vice-President W. R. Marshall, chairman.

9:10 Electrical Music by Everett Orgatron (Courtesy Birkel-Richardson Music Company)

9:30 "The Responsibility of Public Utilities in the Los Angeles County Major Disaster Plan." Undersheriff Arthur C. Jewell and Capt. L. J. Hassack.

10:00 Address.
C. W. Kellogg, President Edison Electric Institute.

10:30 Recess.

10:35 "The Marvel of Radio" (as it appeared in 1921). Carl Haverlin of KFI and KECA.

11:00 "Yesterday and Tomorrow." W. C. Mullendore, Executive Vice-President Southern California Edison Co.

11:30 Introduction of new president.

11:45 Adjournment.

FRIDAY AFTERNOON

Golf.
Optional—Inspection trip to Cal. Tech. to see grinding of 200-in. mirror for Palomar telescope.

FRIDAY EVENING
at 7:30

Banquet and show, followed by dancing—Main Ballroom.

CONVENTION COMMITTEES

Richard E. Smith, Convention Chairman
Joseph A. Long, Program Manager

*Banquet*—Ralph A. Hopkins, Carl Buratti, F. K. Sampson
*Ushers*—D. C. Pence, Sam W. Scott, John Fox
*Publicity*—R. G. Kenyon, H. W. Hayes, C. W. Leihy
*Registration*—Emmett Jones
*Picture Gallery*—William A. Cyr
*Gallery of Novelties*—David Hall, J. H. Cunningham, Gordon Nott
*Street Lighting Display*—A. L. Pryor
*Ladies Matinee Tea*—Harold D. Conklin
*Planetarium Trip For Ladies*—Mrs. Jeanette I. Rees, P. H. Duckner
*Golf*—Harold Thrane
*Cal. Tech. Trip*—A. D. Brown
*Auditor*—W. E. Madden


*Flash!*

**P.C.E.A. REVIVES CONVENTION CHOOSES HOTEL HUNTINGTON**

*May 20th and 21st*

BACK to the Huntington! Back to the P.C.E.A. Convention Headquarters of previous years to profit from intimate business contacts made enjoyable by delightful accommodations. Here at the Huntington Hotel, your first chance in five years to see the "old gang" gathered together in one place will be, we assure you, a memorable one.

**Bring the Family**

Let your family in on the treat. They too will enjoy the restful comfort, luxurious conveniences, splendid meals, and the abundant recreational facilities available for children and adult alike. Located in a fairyland of flowers and trees, Hotel Huntington is easily the ideal vacation spot for your family. So attend the P.C.E.A. Convention May 20 and 21. Stay at the hotel where service and accommodations fit the Convention's theme "Maintaining Leadership."

**Special Conventions Rates**—To those attending the P.C.E.A. Convention American plan rates will be $8.00 a day, $7.00 each for two in a room with bath. Send in your reservation early direct to Hotel Huntington, S. W. Royce, Manager.

*The* **Huntington**
PASADENA, CALIF.

**OFFICIAL P.C.E.A. CONVENTION HEADQUARTERS**

# NOT "JUST A MOVING ELEMENT" But the Only One with the LIFETIME BEARING

This moving element rotates easily and almost without friction upon the ball and double-jewel bearing. No other meter has this exclusive advantage.

Pioneered in 1901, thirty-five years of operating experience prove that the ball and double-jewel bearing lasts the life of the meter. Never requiring lubrication of any kind . . . never needing any adjustment . . . this bearing has saved untold sums in periodic lower-bearing replacements.

**IN ADDITION,**

the Westinghouse moving element has these other important refinements:

1 *The Disc* is permanently and accurately located on the shaft, requiring no adjustments. The entire assembly is accurately trued and balanced.

2 *Bronze Guide Bearing*—The top bearing consists of a tiny bronze bushing highly polished and specially shaped to assure self-alignment of the steel, top-bearing pin. This construction assures long wear with minimum friction.

3 *Machined Pinion*—For greatest efficiency and minimum friction, the register is driven from a pinion milled directly on the disc shaft. No other method could assure the accuracy required of a Westinghouse meter.

4 *Stroboscopic Testing*—Four hundred notches milled around the edge of the disc make easy the use of stroboscopic testing.

By no means is this meter part "just a moving element". It typifies the skill and painstaking craftmanship that have made Westinghouse meters unequalled not only for initial but also *sustained* accuracy; and is an outstanding reason why these meters assure, with minimum attention and maintenance, the truest registration of consumed energy. J 40083

***Ask our representative for detailed information.***

**Westinghouse** METERS INSTRUMENTS RELAYS

# There's Profit In Private Telephones

**Your customers that need quick interior communication—and practically all of them do—will find no finer private telephones than these handsome modern handsets, made by one of the oldest and largest manufacturers of public telephone exchange equipment.**

## AUTOMATIC ELECTRIC INTERCOM SYSTEMS

**Are supplied in capacities of 2, 6, 10 and 11 stations with wall or desk type telephones. Being easy to install, simple to operate and good to look at, they will find a ready market in your territory. Write for catalog and discounts.**

[ AUTOMATIC ELECTRIC intercom systems are designed for private service. They cannot be connected with the public telephone system. ]

**American Automatic Electric Sales Company**

**1033 West Van Buren St., Chicago**

Los Angeles Office: 555 S. Flower St. San Francisco Office: 325 Ninth St.


## Engineers Exchange Ideas at Denver

Many experiences were brought to light and many new ideas digested when 36 members of the engineering division of the Rocky Mountain Electrical Assn. gathered late in March in Denver for the division's spring conference. Chairman L. M. Robertson presided.

First section reporting was the accident prevention and first aid groups under chairmanship of Charles Dwyer, Public Service Co. of Colorado. Reporting that 50 per cent of all accidents involved men who had been on the job less than 2 years, they sought solution to this problem. The use of rubber gloves and other similar devices was classified as the second line of defense which will not compensate for carelessness. Grounding lines for safety during maintenance was found to be general practice.

The meter committee under W. C. Quandt, Southern Colorado Power Co., reported that all of the fourteen companies represented are using the new sequence. For service entrance, most companies reported using the wedge-type clamp. Two companies are using socket-style meters and two are using outside meter boxes. Discussions of four-wire, three-phase metering, fusing of potential transformers, and testing of customers' meters followed. General experience was that old instrument transformers are still accurate.

The overhead systems committee, with O. P. Reed of Cheyenne Light, Fuel & Power Co. as chairman, reported on R. E. A. projects that are under consideration. Consensus of group opinion was that the overhead systems committee should study rural construction. Discussion pointed to the hazard of using a common neutral system, as the neutral breaks and good grounds are not used. Importance of low resistance grounds was stressed. Considering vibration troubles, engineers pointed out that these are directly proportional to span lengths, that all companies which had installed A. C. S. R. without immediate loads had experienced vibration breaks, that installation of armor rods has eliminated difficulties.

Detailed consideration of lightning protection followed. All companies using interconnections of lightning arrestors and secondary grounds reported greatly improved their service.

The prime movers committee, with A. A. Woodward, Public Service Co. of Colorado, presiding, brought out that two companies are using a new rotating machine protection system against lightning. Others expressed interest.

WHAT — at any cost — is more important than safety in wiring a home or industrial building where a slight defect may cause a few, perhaps thousands of people to flee for their lives from fire or explosion.

No other type of wiring offers the safety, permanence or economy of concealed knob and tube or open cleat wiring with flame-proof rubber covered wire.

These are the only wiring systems that give the complete protection, the perfect insulation of porcelain at every danger point! They eliminate the grounding problem. They completely insure against the hazard of faulty connections and protect against acid atmosphere, rust and corrosion long after steel and fibre have failed.

Full details are covered in the handy Wall Chart and The Fact Manual of Standard Electrical Porcelain. Write for your copy.

**STANDARD ELECTRICAL PORCELAIN MANUFACTURERS**

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**CHICAGO, ILLINOIS**

## Accounting, Subject For Northwest Meeting

Accounting problems imposed on utility companies by recent legislation will be considered at the twelfth annual meeting of the Accounting & Business Practice Section, Northwest Electric Light & Power Assn., in Boise, Idaho, May 14-15, according to R. W. Miller, Idaho Power Co., section chairman. Among these subjects are the new N. A. R. U. C. classification of accounts and payroll procedure to comply with the Social Security Act.

Sessions will be held at the Hotel Boise all day Friday, and Saturday morning. K. M. Robinson, president of the Idaho Power Co., will open the meeting.

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## L. A. Bureau Will Reduce Rates

Water and Power Commissioners of Los Angeles have approved recommendations of E. F. Scattergood, chief electrical engineer of the municipal Bureau of Power and Light, for rate reductions to approximate $1,250,000 annually. The reduction, to become effective July 1, represents a 5-per-cent cut in the present rate.

In February, 1936 rates were reduced by approximately $2,500,000. Mr. Scattergood said revenues since the acquisition by the Bureau of Power and Light of the electric properties of the Los Angeles Gas and Electric Co. justify the proposed reduction.

•

A CONFERENCE ON UNDERGROUND corrosion has been scheduled by the National Bureau of Standards, U. S. Department of Commerce, to be held in October. Any organization submitting a paper may send delegates. Information is available from K. H. Logan, of the Bureau, Washington, D. C.

•

WASHINGTON STATE department of public service last month ordered the Washington Gas & Electric Co. to reduce its residential and street-lighting rates at Longview, Ryderwood and adjacent rural areas by 5 per cent, effective May 1. The reduction amounts to $20,000 a year.

•

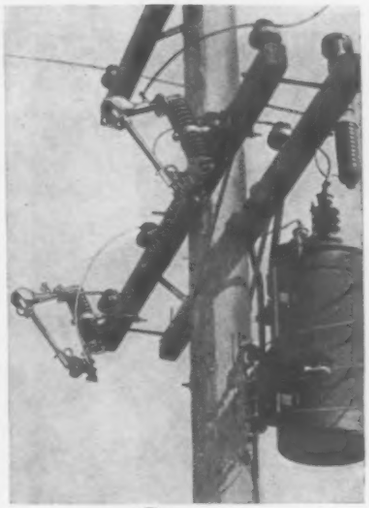
THE INTERNATIONAL CONFERENCE on large electric high tension systems will convene in Paris, June 18 to July 2, for its 9th biennial conference. Details may be obtained from F. Lockwood, 50 Church St., New York. Also meeting in Paris June 14 to 23 will be five committees of the International Electro Technical Commission.

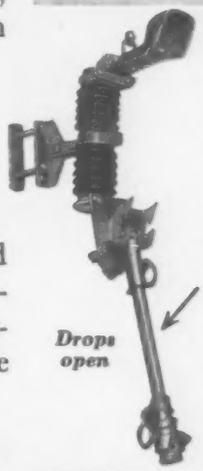

# Reduce Your Maintenance Costs Get Better System Protection

S & C Semafor Cutouts and Fuse Links are being installed with increasing regularity, because they reduce maintenance costs on distribution circuits.

In the design of S & C Semafor Cutouts and Links is embodied S & C's long experience in circuit interrupting equipment field. The characteristics and design features of the small S & C Fuse Links used are similar to those of its big brother, the S & C Liquid Fuse, with which all power engineers are well acquainted.

In Semafor Cutouts you find the results of S & C painstaking engineering and manufacturing skill and the S & C tradition of preciseness is translated into long satisfactory service — dependable protection of your system.

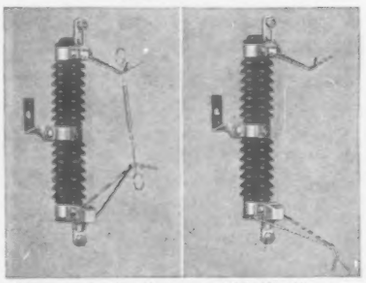





*Made in 50 and 100 amp. capacities in light and medium duty types up to 23,000 Volts and heavy duty to 46,000 Volts. Circuit interrupting process is completed inside the tube before upper contact is disengaged.*

### Stop Unnecessary Outages

Unnecessary outages are prevented—fewer links to replace, —unnecessary service trips are saved,—S & C Semafor Cutouts and Fuse Links are paying for themselves on lines in every part of the country . . . Get bulletin 215-A which contains all the data.



*Above: S & C type "MO" Cutout, 7500/12500Y Volt, 25 ampere, shown with and without fuse link.*

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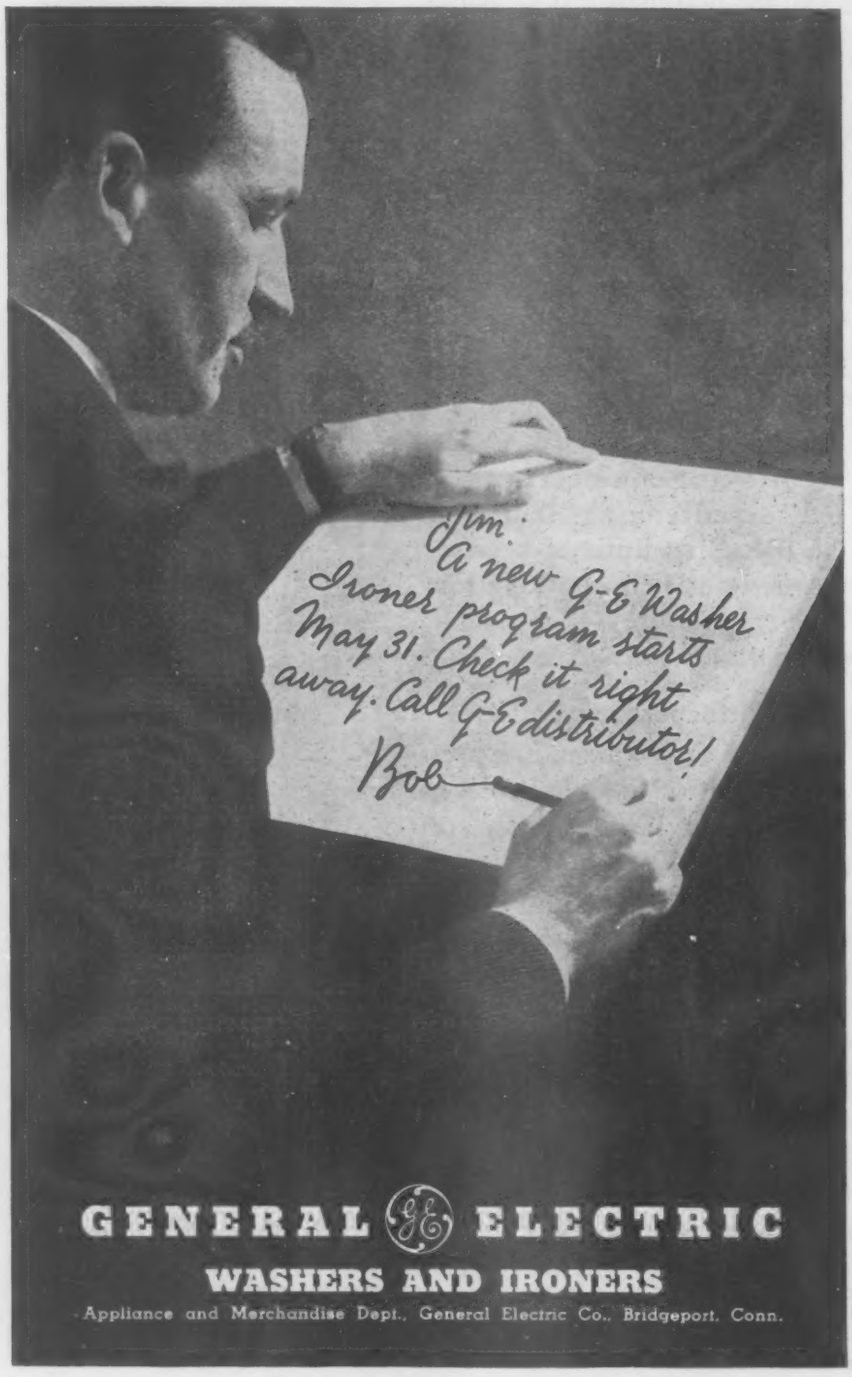
LOS ANGELES: Farnham & Cunningham, Edison Bldg. SALT LAKE CITY: Riter Engineering Co., Kearns Bldg.

## Utilities Report Gains for 1936

PACIFIC GAS & ELECTRIC CO., bore out indications of improvement in a report which gave gross operating revenues for 1936 as $95,333,336 against the 1935 total of $92,084,934. Operating charges, exclusive of Federal income tax and including depreciation provision of $13,009,810 totaled $54,358,166 against $52,279,853. Net income to surplus amounted to $24,968,528 against $23,521,925. After deduction of all prior charges there remained a balance of $15,963,059, equivalent to $2.55 a share on the 6,261,257 shares of common stock outstanding and held by 32,875 stockholders. The company reports a definite and well sustained upturn in business volume.

---

SAN JOAQUIN LIGHT & POWER CORP. reported gross operating revenues for 1936, as $13,434,798, an 8.95 per cent increase over 1935. Operating expenses and provision for depreciation and contingencies amounted to $8,514,724, a 3.85 per cent increase. All employees last year received wage raises to or above pre-depression levels, but the five-day week is maintained.



NORTHWESTERN ELECTRIC CO. reported its 1936 operating revenues as $4,184,660 for 1936, compared to $3,856,581 in 1935. Expanding business and higher payroll and material costs raised operating expenses 4 per cent to $1,943,453, excluding record taxes of $647,887.

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SOUTHERN CALIFORNIA EDISON CO., LTD., showed an 11 per cent gain in gross operating revenues for 1936, according to preliminary figures. They amounted to $41,656,018, an increase of $4,029,682 over 1935. Net earnings totaled $12,760,559, as compared with $11,742,594 in 1935. Concurrently with an 11 per cent increase in consumption, active meters increased by 19,519 to an all time high of 489,592 at the close of the year.

---

WASHINGTON WATER POWER CO. and subsidiaries in Washington and Idaho earned net revenue of $2,555,436.58 during 1936, acording to the financial report released last month. Net revenue showed a $200,577.72 increase over that for 1935.

Gross revenue for all companies was stated as $9,726,827.53, an increase of $1,093,478.13 over that for the previous year. Substantial increases in operating expenses, taxes and retirement charges reduced the increase in net revenue.

Substantial increases in temporary loads resulted in a portion of the increased revenue. During 1936, revenue from sale of power to the Montana Power Co., which suffered through water shortage, increased $159,000. At the same time sales to contractors at Grand Coulee project increased $56,000.

---

PUGET SOUND POWER & LIGHT CO. and subsidiaries for the year ended Dec. 31, 1936, shows in its preliminary report, net profit of $1,662,600 after all charges, including depreciation, interest, amortization and taxes. For the previous year, the company reported a net profit of $1,094,933.

Operating statistics show that the company passed its previous load and customer peak, established in 1930. Customers served at Dec. 31, 1936, totaled 176,220, against the 1930 high of 150,000. Power delivered in 1936 amounted to 790,000,000 kw.-hr. compared with a 1930 peak of 771,000,000 kw.-hr. Average power use per customer in 1936 was 1,141 kw.-hr., against 1,060 kw.-hr. in 1935, an increase of 7.6 per cent. Average revenue per customer was $31.99, against $30.98 for 1936, a gain of 3.3 per cent.

## Northwest Engineers Hold Section Meeting

With a program designed to coordinate system planning and expansion with the record demand for load now being installed in their territory, engineers of the Northwest Electric Light and Power Assn. met in Portland, April 21-24. Over 200 members of the Engineering and Operating Section participated in the productive "working."

Important innovation was the coordination between engineering and commercial sections made possible by the presence of W. C. Mainwaring, vice-president of the Association and George Wisting, Commercial Section chairman. Need for such coordination was stressed in an address by Mr. Mainwaring. He

outlined relationships between the two sections and pointed out the need for engineering thoroughness and commercial enthusiasm to build for the future.

Guest speakers included J. O'R. Coleman, engineering staff, Edison Electric Institute, who spoke of national problems requiring sectional consideration. A. W. Copley, Pacific Coast engineer, Westinghouse Electric & Mfg. Co., in an illustrated talk, described the 200-in. telescope being built for Palomar.

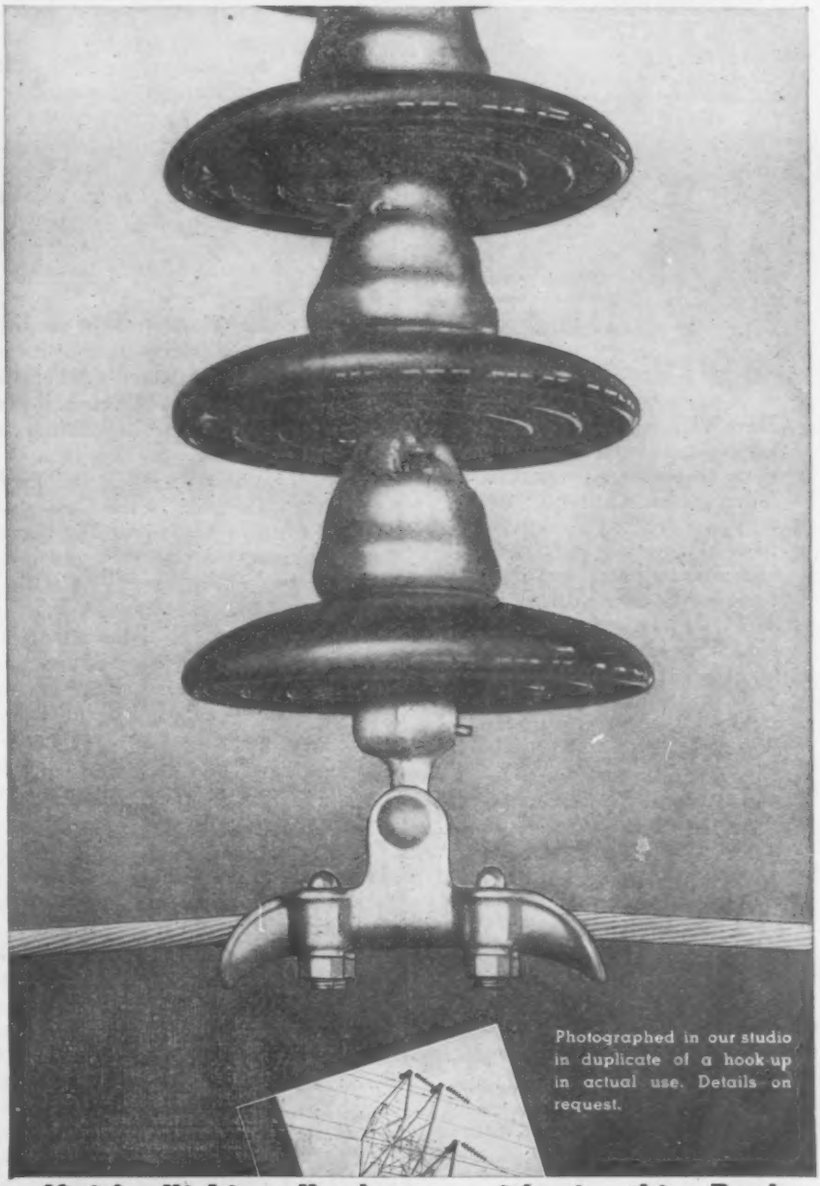
Paul B. McKee, president, Pacific Power & Light Co., officially welcomed the delegates to Portland. Each of the six committees was given a half day for discussion of papers all of which will be published in June ELECTRICAL WEST.

Entertainment under H. H. Schoolfield, Pacific Power & Light Co., included a get-together luncheon with the Portland Electric Club, at which Frank Branch Riley, Portland's Ambassador of Goodwill, was principal speaker; the annual banquet; bridge teas, sightseeing tours and a theatre party for visiting ladies. On April 24, visitors spent the day inspecting Bonneville project.

Arrangements were supervised by Joe Hellenthal, Puget Sound Power & Light Co., section chairman for the past two years, assisted by Berkeley Snow, executive secretary. Tom A. Purton, Idaho Power Co., was elected next year's chairman and A. Vilstrup, B. C. Electric Railway Co., vice-chairman.

Hardware - BTC

Drop Forged Clamp No. 6204, Ball Hook No. 3001, Drop Forged Caps.



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A GRIP FOR ALL NEEDS

*No. 1628-5 B. "Chicago" Grip. Maximum opening .563. Minimum opening .115. Safe Load, 8,000 lbs.*

**Here's the new "Chicago" Grip capable of handling messenger or guy strand from 3/16 in. diameter up to 1/2 in. diameter. A genuine all purpose grip that can also be used satisfactorily on bare conductors, solid or stranded, from No. 6 to No. 4/0 seven strand copper and A.C.-S.R. up to No. 3/0. A grip that even satisfactorily handles the new three-strand "copperweld" conductor. The bronze-lined jaws prevent slippage. This new grip will afford a sure hold under all conditions, with loads up to 8,000 lbs.**

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- ☐ Safety for the Pole Climber.
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**Mathias KLEIN & Sons**
Established 1857 — Chicago, Ill. U.S.A.

**3200 BELMONT AVENUE**


## Municipal Plant To Be Built in Idaho

Coeur d'Alene, Idaho, last month awarded a contract for construction of a municipal power system to Fairbanks-Morse & Co., Chicago, low bidder at $295,000. The project contemplates a diesel generating plant and a distribution system to serve a portion of the town.

Construction, however, will be delayed by litigation, according to W. J. McIntosh, Fairbanks-Morse representative at Seattle. Suit was filed in district court by five Coeur d'Alene citizens seeking to enjoin and restrain the city from proceeding, on grounds the plant would be inadequate, that due to rising prices the allotted sum would not be sufficient and that PWA assistance, which was expected when the voters approved the project, is no longer available.

●

FOLLOWING INVESTIGATION of conditions which led to the interruption of its service on Vancouver Island in February, the British Columbia Electric Railway Co. has an extensive rebuilding program for the area.

The program of work is designed to strengthen the links in the transmission system which gave way during the winter, and involves no new construction. It will be concerned chiefly with rebuilding of the transmission lines and clearing of trees in the most thickly-wooded areas. Cost is estimated to exceed $100,000. Concerned are the main feeder from Jordan River, the connection with the emergency plant at Brentwood, and the tie-line between the Jordan River and Brentwood plants across Finlayson Arm.

●

THREE NEW STANDARDS have been released by the National Electrical Manufacturers Assn. The first, NEMA attachment plug standard, publication No. 36-40, concerns the manufacture and tests of attachment plug caps, bodies and receptacles. NEMA oil circuit breaker standards, publication No. 36-38 and NEMA power switchboard standards, publication No. 37-39, cover all available information on the manufacture, test and performance of these. Copies are available from the association at 155 East 44th St., New York, N.Y., at: plugs 25 cents, circuit breakers 90 cents and switchboards $1.10 a copy.

●

AN ORDINANCE authorizing the expenditure of $55,500 to replace two 10,000-kva. transformers in Taylor Way substation, Tacoma, with two transformers of twice the capacity has been introduced in the city council.

GOOD PROVIDER

In his opinion, a sound estate, entrusted to experienced managers, may be a husband's outstanding gift to his family's happiness.

Our Trust Officers are ready to help you create such security.

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● Schweitzer & Conrad, Inc.

**Connectors, Ground Rod Clamps, Utility Hoists**
● Jasper Blackburn Products Corp.

## Boulder Contracts May Be Revised

Modification of existing contracts covering the sale of power from Boulder Dam was discussed last month at a public hearing in Washington. In attendance were representatives of the federal government, the states concerned, and the contractors for power.

Outlining the position of the federal government, John C. Page, Commissioner of Reclamation, stated that although the bureau does not, at this time, advocate revisions in the contracts, it recognizes a number of unsatisfactory features in them. The meeting was called following urgent requests of power contractors.

First presented was the case of the Metropolitan Water District of Southern California, represented by James H. Howard, general counsel. This is a public corporation created in 1928 by the California legislature to bring Colorado River water to thirteen noncontiguous municipalities in southern California, of which Los Angeles is the largest. It is building the Colorado River Aqueduct and will, when this is completed, sell water at wholesale to its members. It does not sell or distribute power, but is a large power consumer, having contracted for 36 per cent of Boulder's firm power and all of the secondary power. This is used to pump water over the intervening mountains. The district presented these points:

1. Although Boulder Dam was completed two years ahead of time, aqueduct construction is practically on schedule—not ready to operate until late 1939. Under the present arrangement the district faces the necessity of paying during the two-year interval for power which it cannot use. It proposes deferment of this obligation until the aqueduct is completed.

2. The present contract provides that the district shall take 55 per cent of its full allotment during the first year of availability, stepping up to 100 per cent in three years. The district requests that the period of increasing consumption be lengthened to from 15 to 20 years. (Subsequently, the district indicated its willingness to assume 100 per cent load by 1945, the date of the first rate revision, and to compensate, by a higher rate, the loss that would result to the development fund.)

3. The district feels that amortizing generating equipment in 10 years is unduly burdensome, that this be extended to 50 years.

4. The interest rate of 4 per cent specified during the amortization period is in excess of the current cost of money to the federal government. The district suggests a reduction to the going rate.

5. The principle of requiring power revenues to repay parts of the investment charged to other purposes is not followed in building other federal projects. The district suggests that the United States absorb the $25,000,000 charged to flood control.

6. Divided operation of the power house will result in duplication of personnel and other expense. The district suggests unified operation by the federal government.

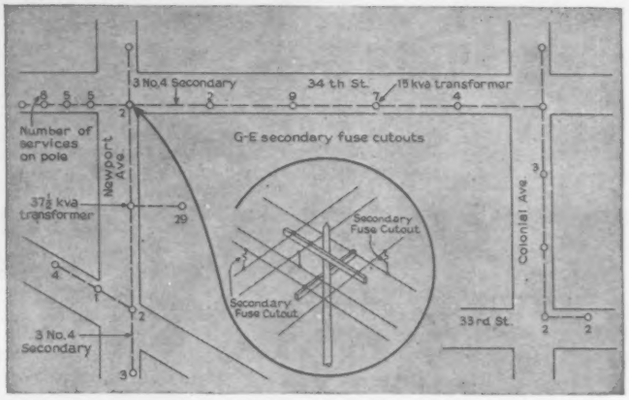
The Southern California Edison Co., through its vice-president and general manager, Fred B. Lewis, stated that it is seeking no modification of existing contracts. However, if revision should be decided upon, he suggested fixing rates with consideration to costs in other competing areas and by other means of generation.

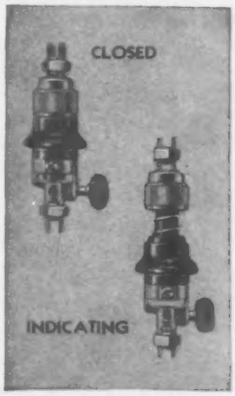
Governor R. C. Stanford of Arizona intimated that Arizona is having as little as possible to do with the Boulder project.

Additional briefs will be submitted to the Secretary of the Interior by all parties concerned, and he will then determine what, if any, contract modifications are advisable.


**HERE'S AN EASY, ECONOMICAL WAY TO REDUCE LIGHT FLICKER**

**BANKING OF TRANSFORMER SECONDARIES USING G-E SECONDARY FUSE CUTOUTS**




*G-E secondary fuse cutouts. When a fuse blows, the indication is plainly visible from the ground*

BANKING of transformer secondaries helps overcome light flicker and enables higher loading with protection to transformers and service. G-E secondary fuse cutouts make secondary banking economical and practical. Voltage levels are maintained, and this scheme will often obviate the necessity of installing additional transformers or larger secondary copper. Ask for Bulletin GEA-2261B. General Electric Company, Schenectady, New York.

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STRAIGHTLINE DEAD ENDS

For use with disk insulators. Also used with eyebolts terminating neutrals on rural lines.

The Reliable Straightline Dead End has a wire holding mechanism, identical with that in the Reliable Straightline Splice, fastened to a small but husky reinforced clevis.

Makes a neat, convenient, and economical installation.

Its low price will interest you. Write for bulletin.

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OVER 25 YEARS SERVICE TO THE UTILITIES
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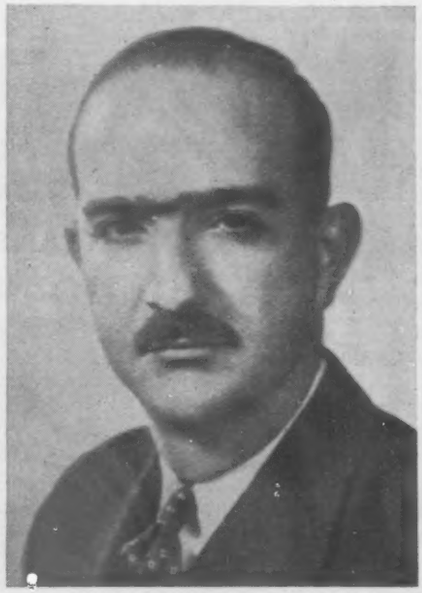
# About People

## Hotpointer Heads New Distributor Concern

Clyde E. Allen, an important factor in the organization of the Electric Kitchen Appliance Co., San Francisco independent distributor for northern California and Nevada of Hotpoint appliances, hase become general manager of the new concern. Mr. Allen for the past 17 years has been with the Edison General Electric Appliance Co., for which he began as service man in San



CLYDE ALLEN

Francisco in 1920. In 1926 he was made manager of the San Francisco service department and later in 1929 took charge of the San Joaquin division of the San Francisco district under Ray Turnbull. In 1931 he became a specialist in water heating and offpeak water heating schedules. In 1933 he was made San Francisco district manager for the entire Hotpoint line.

With the recent change in distribution policy on Hotpoint appliances, Mr. Allen left the Edison General Electric Appliance Co. to help organize the new Electric Kitchen Appliance Co. It now distributes the range, water heater, refrigerator, laundry equipment, dishwasher, Edison Hotpoint heavy duty line and, likewise, is a distributor for Whitehead monel metal sinks and kitchen cabinets.

The firm maintains an architectural staff for kitchen planning service to dealers handling the line. Likewise, a series of display kitchens are maintained for benefit of dealers. Here dealers may bring their customers to see different combinations of kitchen equipment in kitchen environment.

Crapo GALVANIZED PRODUCTS

Seven Wire Steel Strand

Telephone and Telegraph Wire

Crapo Galvanized Steel Strand is quickly, easily and economically served. Its *pure zinc* coating is so adherent and so ductile that it withstands vigorous bending and twisting without cracking or peeling. This insures corrosion-resisting joints, longer years of service, lower maintenance costs.

Crapo Galvanized Seven Wire Steel Strand and Telephone and Telegraph Wire are available in all standard grades and sizes.

Indiana Steel & Wire Co.
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THE SAFE ANCHOR FOR R. E. A. CONSTRUCTION!

For long life and economy in annual maintenance cost, Everstick Anchors are first choice in rural electrification construction. Their safety and dependability have been proven on millions of miles of electric lines.

ANCHORS FOR EVERY PURPOSE

The complete line of Everstick Anchors offers three expanding types in a complete range of sizes and holding capacities. Also rigid type Cone Anchors in all sizes. Made of malleable iron with its properties of strength, elasticity and rust resistance. Write for new bulletin "Everstick For Rural Electrification."

The Everstick Anchor Co. ☆ FAIRFIELD, IOWA

## Utah Power & Light Makes Promotions

Five important promotions have been announced by the Utah Power & Light Co., through P. M. Parry, vice-president.

James A. Bullock, manager of the company's Preston, Idaho, division has been appointed general manager of the Western Colorado Power Co. He succeeds J. A. Clay, who will become associated with the Utah company's engin-

JAMES A. BULLOCK

eering and operating department at Salt Lake City. Mr. Clay will retain the position of vice-president of the Colorado company.

Mr. Bullock joined the Utah Power & Light company in 1916 in the field of selling; later became statistical clerk and again chief clerk in the Provo division. He was made manager at Preston in 1930.

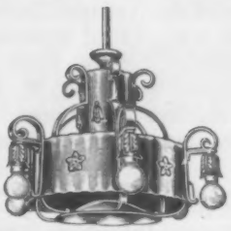
Mr. Clay went to Colorado in 1905 to finish construction of the Animas Power & Water Co. When reorganized as Western Colorado Power Co., Mr. Clay was made general manager. He became vice-president and general manager in 1931.

At the Provo division of the Utah company, George L. Ellerbeck was named manager. Succeeding Mr. Ellerbeck in the Salt Lake general office as superintendent of industrial sales is D. H. Hutchinson.

At Preston, R .R. Rowell moved from commercial superintendent of the Colorado company, to take the managership. ●

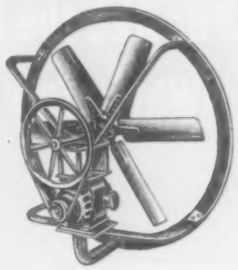
MARVIN S. BANDOLI has been appointed sales manager of the Domestic Refrigerating Division of the Nash-Kelvinator Corp.


# KISCO PROVIDES COOLING COMFORT



### The AIRistocrat "Deflecto"

Here is the last word in air recirculation. This new model was designed for both appearance and performance. In it, we have embodied the patented "Deflecto" principle, which is recognized for its unique method of air recirculation.



### Exhausters—Motor and Belt Drive

Offered with single and two speed control; also belt drive in sizes up to 48". Kisco Exhausters are sold on performance — air delivery — and not inches. Ruggedly constructed, attractively finished.

### "DeLuxe" Air Movers and Coolers

Offered in four models, Pedestal, Hi-Boy Pedestal, Ceiling, and Wall-Bracket. Each of these models is offered in two sizes and the performance is guaranteed.

### "Breezy Tales of Summer Sales"

Have you received your copy of this new photo manual? If not, write today.

**SMALLCOMB ELECTRIC COMPANY**

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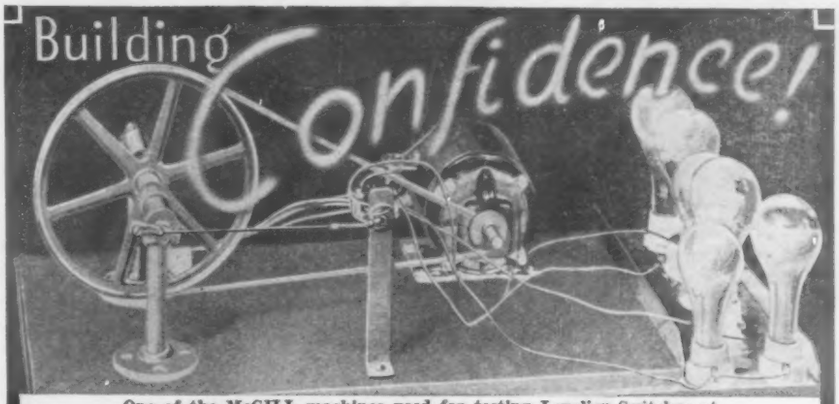
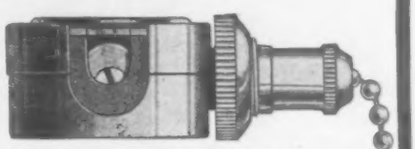
KISCO COMPANY, INC. ST. LOUIS, MO.






One of the McGILL machines used for testing Levolier Switches at more than 30 pulls per minute lighting six 100 watt lamps each time.

Users and makers of fractional horsepower motors, especially, like the way Levolier Switches hold up. No wonder: They are put to tests more severe than required by Underwriters' Laboratories. And every individual switch is tested cold, on full load, before it leaves the factory.



No. 41—Only 5/8-inch thick

## McGILL *Levolier* SWITCHES

A few of the switches in the wide Levolier line include:

No. 41—Smallest 6-amp. switch for conduit boxes, canopies, fixtures, etc.

No. 39—Same, except with link for substituting for any link desired removed from original fixtures. Saves rewiring.

No. 1010—For controlling 1000-watt high intensity lamps.

No. 1039—Same, except with link.

No. 1020—10 amp. 2-circuit switch for 2-filament, 3-light lamps, up to 1250 watts.

No. 1029—Same, except with link.

McGILL MANUFACTURING CO.
VALPARAISO, IND.

Box No. 604

FULL REVENUE
For ALL the Loads
When You Use
MODERN METERS
Sangamo Type HFS Socket Meter
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LOS ANGELES 326 Subway Term. Bldg.
SAN FRANCISCO 1061 Howard St.
SEATTLE 220 Ninth Ave. N.
PHOENIX 1318 W. Lynwood St.
DENVER 1526 Blake St.
SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

## Ben Franklin Club Elects Officers

Charles B. Clendenen, Pacific Coast district manager of the National Carbon Co., last month was elected president of the Ben Franklin Electric Club of Northern California, succeeding W. W. Glosser, vice-president in charge of Pacific Coast operations of Hubbard & Co.

Other officers include H. H. Benfield, Steel & Tubes, Inc., first vice-president; S. B. Gregory, Arrow Electric Division of Arrow-Hart & Hageman, second vice-president and H. Q. Noack, Hubbard & Co., secretary-treasurer. Board of directors: A. W. Rockwell, Appleton Electric Co., L. Siebert, Trumbull Electrical Manufacturing Co., H. J. Newton, National Electric Products Co., R. B. Peterson, Garnett Young & Co. and Mr. Glosser, the retiring president.

●

JOHN WRENN, veteran of utility merchandising and cooperative activity, has been appointed assistant dealer promotion director of Pacific Gas and Electric Co. Mr. Wrenn becomes assistant to Bert Reynolds in the supervision of the dealer promotion activity, enlarged this year by that company. A former Great Western Power Co. sales executive, Mr. Wrenn has been the guiding spirit in the formation of the Electric Refrigeration Bureau in northern California, the Air Conditioning Society, and other cooperative activities.

●

A. N. "ART" NIELSEN and C. A. "Art" Rowley have joined Thermador Electrical Mfg. Co., Los Angeles, Calif., according to L. A. Bartlett, sales manager. Mr. Nielsen has been in the electric heating field in California for twelve years. He will be district manager of the area comprising San Fernando Valley, Burbank and Pasadena to Palm Springs. Mr. Rowley, a graduate engineer of Syracuse University, was an engineer for Arizona Power Co., and for fifteen years headed the Rowley Electric Co., Pasadena, dealer-contracting organization. He will become district manager for Pasadena and Glendale and be accessible to architects.

●

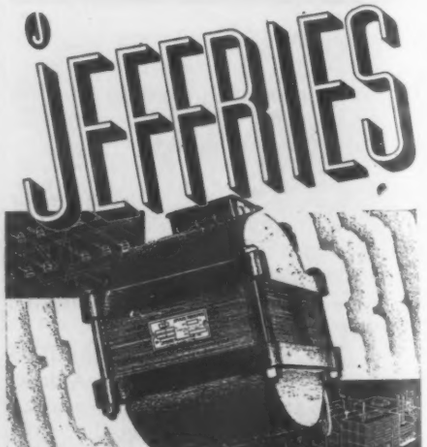
RALPH J. CORDINER, assistant manager of the appliance and merchandise department of the General Electric Co., Bridgeport, Conn., visited the Pacific Coast during March and conferred with distributors. Mr. Cordiner will be remembered as former Pacific Coast manager for Hotpoint.

●

FREDERICK LOUIS MAYTAG, 79 years of age, washing machine manufacturer, died at a Los Angeles hospital March 26. Death was due to a heart ailment. His home was in Newton, Iowa, but he spent his winters in California.

Underground Transmission
Without Conduit
Note the air and moisture proof flexible coverings. Sealtite represents a distinct advance in parkway cable construction. It is more pliable than any other underground cable . . . and costs are considerably lower.

Write for booklet offering suggested uses and explaining long life.
SEALTITE
Parkway and Airport Cable with Maximum Flexibility
by
PROVIDENCE
MAYDWELL & HARTZELL
INCORPORATED
ELECTRICAL ENGINEERS
and
MANUFACTURERS' REPRESENTATIVES
Los Angeles ★ San Francisco

JEFFRIES

TRANSFORMERS
Save Their Cost and Pay Dividends by—
1. Elimination of duplicate conduit runs.
2. Saving in power rate.
(Put all of your 110-volt equipment on a 220-volt or 440-volt power circuit, it is economical.)
JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles

JOHN H. MADDOX has resigned as Pacific Southwest manager of the Miller Co. to become manufacturers' sales representative in the Pacific Coast states and British Columbia for the Colonial Premier Co. of Chicago, manufacturers of all kinds of portable lamps and pioneers in the I. E. S. lamp field among utility companies. Mr. Maddox had been associated with the Miller Co. for the past 15 years, first at Atlanta, Ga., and for the past 11 years in San Francisco. His San Francisco offices will be at 639 Mission St.

●

AL WOTKYNS, former owner of Quality Electric Works, Los Angeles, has rejoined the Quality Electric Co., Ltd., according to announcement by J. O. Case, president. The Quality Electric Co. was purchased from Mr. Wotkyns by a syndicate headed by Mr. Case in 1930.

●

HAROLD F. O'BRIEN, for the past 7 years industrial salesman for the T. L. Rosenberg Co. of Oakland, has resigned to accept a sales position with the Square D Co. in the San Francisco office under A. S. Fraser, district sales manager. He will specialize on motor control equipment, covering California north of Tulare. Mr. O'Brien started with Westinghouse in Los Angeles in 1912. He spent 10 years with the company, handling movie studio and theater business until employed by Famous Players Lasky Studio as electrical engineer for 2 years. He then became service department salesman for Westinghouse company at Emeryville, where after 7 years he joined the T. L. Rosenberg Co. O'Brien has been prominent in Oakland Electric Club and industry affairs in the Bay territory.

●

CARL L. SUNDLAND, formerly sales supervisor of Portland General Electric Co., Portland, has joined the sales force of Graybar Electric Co. there, to specialize in northwest distribution of Hotpoint appliances.

●

JAMES C. ZANCKER, vice-president and general manager of Electrical Products Corp. of Oregon, Portland, resigned from that position late in March, "on account of the press of other personal matters." No successor has been named. He retains his position on the board of directors of the Electrical Products Corp. of Oregon, the Claude Neon Electrical Products Corp., Ltd., and the Electrical Products Corp. of California.

●

F. L. HOCKENSMITH has been appointed a member of the executive committee, representing division 4, the Pacific Coast region, in the International Assn. of Electrical Leagues.

HEMINGRAY
Glass
INSULATORS

*for primary and secondary insulation service and rural line needs.*

**Brass-bushed for great strength, perfect threads and full protection against pin expansion.**

**Hemingray provides many advantages: greater mechanical strength . . . sustained dielectric strength . . . unaffected by sudden temperature changes . . . withstands maximum insulator pin expansion . . . never ages or deteriorates . . . all surfaces impervious to moisture . . . tougher—withstands rough handling . . . clear and flawless for easy inspection.**

**Available in all styles . . . clear or brown glass . . . ratings up to 15,000 volts. Write for samples.**
**Owens-Illinois Glass Company . . . Muncie, Indiana.**

The New A.B. CHANCE CATALOG
OF POLE LINE EQUIPMENT
*is*
ON THE PRESS

IF YOU BUY, USE OR SPECIFY:

- ANCHORS
- GUYING FIXTURES
- LINE TOOLS
- CABLE RINGS
- CABLE CHAIRS

YOU WILL WANT A COPY
WRITE DEPT. D OR TEAR OUT AND MAIL THIS AD TODAY

Dept. D:
Put me in line to receive your new FREE catalog.

Name..... Company.....
Address..... City..... State.....

A·B·CHANCE CO. · CENTRALIA MISSOURI

H. R. ZENKER, formerly Los Angeles manager of the Leo J. Meyberg Co., has been named sales manager of the Western division for the Progress Corp., sole distributors of Packard Lektro-shaver and Lektrolite, with headquarters in Los Angeles. Mr. Zenker announced that the Sir Francis Drake Hotel in San Francisco had publicly made known the fact that it had installed electric convenience outlets in the 600 bathrooms of the hotel so that patrons could use electric razors.

●

DANIEL V. WEBSTER has been appointed district engineer for northern California for the Kim Manufacturing Co., makers of garden lighting equipment, Los Angeles. He will work in cooperation with contractors, architects and home owners, making his headquarters at Hotel Oakland, Oakland.

●

ROBERT HELD, formerly in the operating department of the Puget Sound Power & Light Co., at Wenatchee, has been transferred to Leavenworth, Wash., as local manager. He succeeds W. A. Gallotte who goes to Wenatchee as distribution engineer for the eastern division.


*Sell ranges equipped with*

**CHROMALOX**

**Super-Speed UNITS**

**Flat-topped for fastest heat transmission . . . "Two-burners-in-one" for small-utensil cooking economy, and for ideal frying heat . . . Famous Chromalox construction provides immunity to all ordinary range unit troubles, and cuts servicing costs to the bone. Standard on many nationally famous ranges. Ideal for replacement—fit any range, no need for large stock. Get the facts from our nearest representative, or write us.**

**EDWIN L. WIEGAND CO.**
PITTSBURGH, PA.
Represented by
**MONTGOMERY BROTHERS**
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
912 E. 3rd St., Los Angeles, Calif.
**THE PETERSON COMPANY**
1921 Blake St., Denver, Colo.


# About the Trade

ELECTRIC SUPPLIES DISTRIBUTING CO., of San Diego, Calif., is enlarging its building at 435 Second Ave. with a 50-ft. annex, according to Sam L. Hall, president. Volume of business done last year so crowded the facilities that arrangements were made for purchase of additional ground to increase the size of the building early this year. The company plans to celebrate its 20th anniversary this fall.

●

CARRIER CORP. has opened a new engineering office and display room at 106 North First St., Fresno. W. S. Spitler and M. Laurence Short, district representatives, originally started in Hanford 4 years ago and later had an office in the T. W. Patterson Bldg., Fresno. Associated with them are C. W. McCann, commercial air conditioning salesman, Harry Winblad, Basil Dennison and De Roy Simpson of the Carrier engineering department.

●

THE B. C. NEON CO. LTD. has been incorporated at Victoria with authorized capitalization of $20,000 and registered offices at 524 Vancouver Block, 736 Granville St., Vancouver. It will engage in the electrical and neon sign business.

●

HOME LAUNDRY EQUIPMENT representatives for the various appliance sales districts have been announced by General Electric Co. Home Laundry Division. In the western districts 12, 13 and 15 the following appointments were made: District 12: R. E. Lyford, 529 East 14th Ave., Denver, and Byron S. Wells, 900 East Front St., Butte Mont. District 13: Ted Schlueter, 1201 Bryant St., San Francisco, and Tom F. Dorband, 221 North Rampart Blvd., Los Angeles. District 15: C. J. Anderson, General Electric Co., 2032 Second Ave., Seattle.

●

ENLARGEMENT OF THE STAFF of F. B. Connelly Co. at its Spokane office will accompany remodeling and expansion plans, it was announced by C. A. Tubbs in charge of the Spokane district. Q. B. Griffin has joined the firm as office and credit manager.

●

PEPCO POST of the American Legion, first industrial post in Oregon, was organized last month by World War veterans in Portland Electric Power Co. and subsidiaries. Only eligible employees may join. Charles L. Beck of the Portland Traction Co., Pepco subsidiary, was elected post commander.

BENNETT-FORSBERG CO., INC., electrical contractors of 2901 Beverly Blvd., Los Angeles, point with pride to their latest wiring achievement at the magnificent new Sun Valley Lodge which the Union Pacific Railroad built near Ketchum, Idaho, and which is to be opened at Christmas for guests. It is to be a winter sports mecca and designed to rival in magnificence some of the European resorts of a similar nature. The resort uses all electrical cooking and electrical equipment of the finest sort. The contract included 6 miles of telephone line as well as the wiring of the buildings themselves.

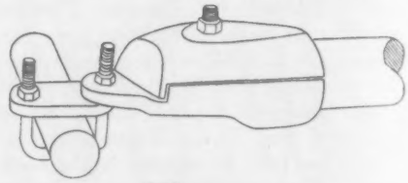
●

MACKINNON SALES & SERVICE, LTD., 1308 Granville St., Vancouver, has been appointed British Columbia distributor for the Universal Cooler Co. of Canada, Ltd. The firm will distribute the Universal Cooler domestic and commercial electric refrigerators.

●

THE BARKON TUBE LIGHTING CORP. of Seattle has acquired substantial interests in the Barton-Frink Tube Lighting Corp. of New York and the English Baker Co. of Portland, Ore., according to Richard E. Fuller, president.


★ *The* **HARTMAN** *Line* ★



THE HARTMAN Protective Type Ground Clamp is the only threadless clamp that will receive the grounding conduit at any angle without having to bend it. Easy to install and neat in appearance. Made for rigid or thin wall conduit. A complete line of U-bolts are carried in stock from 1¼ inches to 6 inches inclusive. For prices and other information, see your jobber.

**B. HARTMAN** 168 Sunset St. Long Beach, Calif.

FOR
- *Lasting Economy*
- *Strength*
- *Safety*

USE

LOCUST PINS
Oak Brackets and Pole Steps

LOCUST PIN CO. FRONT ROYAL, VA.
**Maydwell & Hartzell, Inc.**
Los Angeles ★ San Francisco

THREE HUNDRED members of the electrical industry in Vancouver, B.C., recently were guests of Canadian General Electric Co. at a banquet marking the close of a successful sales school and conference conducted during the winter. H. C. Darroch officiated on behalf of the company. Other speakers were: John Pratt of the Hudson's Bay Co., representing Vancouver electrical appliance dealers, and W. C. Mainwaring, sales manager, British Columbia Electric Railway Co. Prizes won at the school were presented to V. G. Mawer and J. Burchall.

●

THE ELECTRIC CONTRACTING CO. of Seattle was incorporated at 2212 Second Ave., Olympia, Wash., last month by O. A. Carlson, Lloyd Larsen and F. J. Becker, with capitalization of $2,000.

●

## Moved:

THE THOMAS & BETTS CO., San Francisco office and warehouse, to 735 Tehama St.

●

SAN FRANCISCO SALES office of the National Carbon Co., Inc., moved to room 524, Adam Grant Bldg., 114 Sansome St., San Francisco, under E. C. Friday, district manager.

●

ART COLE, of the McGraw Electric Co., to 1627 Hipoint St., Los Angeles.

●

SMOOT-HOLMAN CO., San Francisco office to larger quarters at 33 Dore St. Clem Smoot added to staff.

●

HOLLAND ELECTRIC SHOP, for 17 years in Los Angeles, enlarged quarters at 5634 N. Figueroa St. Operated by John C. Holland who is dealer representative for the Electric Development League there.

●

Hurley Machine Co., Portland, to enlarged quarters at 231 East Burnside St., providing 17,000 sq. ft. warehouse space with railway trackage. H. C. Frost is district manager for Oregon.

●

W. D. KAUFFMAN Electric Co., for 9 years in Alhambra, from 826 E. Main St. to 712 E. Main St.

WESTERN REPRESENTATIVES selling the Ironrite ironer were announced by Gordon E. Wilkins, Western district representative, at recent advance showings of 1937 models held at the George H. Eberhard Co., San Francisco, and the Gordon Wilkins studio showroom at 3100 Telegraph Ave., Oakland. Mr. Wilkins' distributors are George H. Eberhard Co., San Francisco, for northern California; Watson & Wilson Co., Los Angeles; The Maytag Northwest Co. for the states of Oregon, Washington, Idaho, Utah, eastern Nevada and western Wyoming; Lowell Moore Hardware Co., Fort Collins, Colo., for the states of Colorado, eastern and northern Wyoming and northern New Mexico; Dorris Heyman Co., Phoenix, for Arizona; Car Parts Depot, El Paso, for southern New Mexico and western Texas; Prigge Refrigerator & Appliance Co., Bozeman, Mont.; Dickenson Piano Co., Missoula, Mont., and Reedling Music Co., Albuquerque, N.M.

●

HATELEY & HATELEY, heating and plumbing contractors, Sacramento, have been appointed by Frigidaire Corp. as air conditioning and heating dealers there.

ELECTRIC CITY, dealing in the sale and repair of electrical appliances, has been opened at 512 Fourth St., Bremerton, Wash., by Keith Phillips. The store is a unit in a statewide chain with headquarters in the Peoples' Store, Tacoma.

●

STUBBS ELECTRIC CO., Portland jobber, last month entertained 100 dealers from Oregon and southern Washington at a banquet in Portland.

## Classified Section

- **COST of undisplayed classified ads is 5 cents a word, minimum $1.00 insertion. Box numbers in care of our San Francisco office count as 10 words additional in undisplayed ads.**
- **RATES per column inch of displayed ads is $3.75.**
- **ALL classified ads are payable in advance.**

**ELECTRICAL WEST** 883 Mission Street San Francisco, Calif.

**POSITION WANTED**—Electrical Engineer—age 39. Married. 13 years' experience utility operation. Now employed. Desires promotion. Excellent references. Address Box 95, Electrical West, 883 Mission St., San Francisco, Calif.

**REPRESENTATIVE WANTED**—Well established manufacturer of Rigid Steel Conduit and fittings expanding sales organization will consider reliable manufacturer's agent as representative. Give complete details as to territory covered, lines carried, etc. Box 85, Electrical West, 883 Mission St., San Francisco, California.

## PROFESSIONAL SERVICES

**ELECTRICAL TESTING LABORATORIES**

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

80th St. and East End Ave., New York

**ARTHUR R. KELLEY**
**CONSULTING ENGINEER**

Reports and Valuations, Public Utility Industrial Properties

Edison Bldg. Los Angeles


**LINCOLN DEMAND METERS**

Type WD
Watt Demand

Absence of timing mechanisms, and a construction using few moving parts, all of which move very slowly, eliminate the necessity of frequent test and repair in Lincoln Demand Meters.

SEND FOR YOUR COPY OF CATALOG TO:

**LINCOLN METER COMPANY**
SPRINGFIELD, ILLINOIS

# New Products

### Plug-In Instruments

A series of instruments which can be successively plugged into the same socket will shortly be introduced by the Westinghouse Electric & Manufacturing Co. Single instruments can be mounted on the wiring conduit without other support. The universal socket will give any desired load condition by merely successively plugging in an ammeter, voltmeter, watt-hour meter, etc. Standard troughs with several sockets will be made available for use in cases where more than one instrument is to be read at the same time. Extreme simplicity is declared to have been the leading idea in developing the new line. Quick and easy mounting is said to have been worked out for ordinary wiring, such as rigid conduit, open wiring or cable. Industries powered by individual drive particularly are expected to benefit through reduction in the cost of instrument use.

●

### Flush Range Outlet

To simplify connections, allow straight-in wiring and eliminate awkward bends of heavy wire, the Arrow-Hart & Hageman Electric Co. have introduced an improved flush range outlet. It is 3-wire, 50-amp., 250-volt, takes a standard 4-in. or 4 11/16-in. box with standard fittings.

●

### Remote Varidrive Control

Hydraulic remote control providing infinite variation in motor speeds is being offered by U. S. Electrical Motors, Inc., Los Angeles. Operation at the remote control station forces liquid via a cylinder through copper tubing to a cylinder at the variable speed unit itself thus effecting the speed change.

●

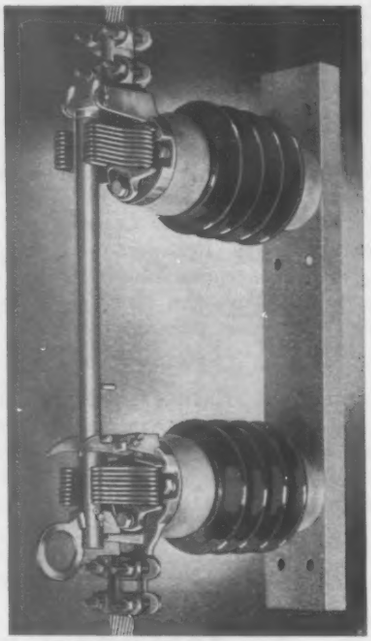
### Mercury Lamp Doubles Output

A small 100-watt mercury lamp producing 30 lumens per watt has been announced in development by General Electric Co. This bulb-in-bulb small edition, unlike the present 250- and 400-watt mercury lamps, operates from a 120-volt line without necessity of voltage step up for starting. A choke is required. Operating at about 2-atmospheres pressure, the light output equals that of a standard filament 200-watt lamp. Important applications are expected in commerce, industry and street lighting. In the latter application, a transformer would be required.

### Commercial Refrigerating Machines

A complete new line of commercial refrigerating machines, called "Scotch Giant," in sizes from ¼ to 50 hp., air cooled and water cooled, has been announced by the Appliance and Merchandise Department of General Electric Co. They embody a refrigerant-cooled valve plate, automatic shutoff of the condensing unit under excess load, automatic belt tightener and other features. At the same time a new line of spinner fin cooling units was announced. They are so constructed that the liquid refrigerant whirls as it passes through the tubing.

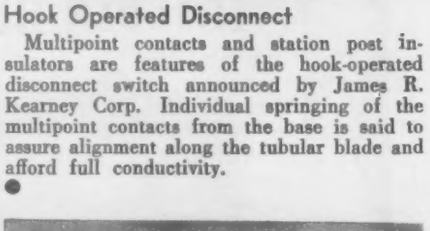
●



### Hook Operated Disconnect

Multipoint contacts and station post insulators are features of the hook-operated disconnect switch announced by James R. Kearney Corp. Individual springing of the multipoint contacts from the base is said to assure alignment along the tubular blade and afford full conductivity.

●



### Air Styled Controllers

A line of fractional hp. drum controllers in casings of modern industrial design is announced by Cutler Hammer Inc. for use with reversible a.c. squirrel cage motors and reversing or non-reversing multispeed squirrel cage motors, they offer: segments secured to insulated cylinder without screws, renewable contact fingers, mounted in individual bakelite mouldings, easy accessibility, self indexing drum.

# Trade Literature

**A postcard to the manufacturer or to ELECTRICAL WEST, 883 Mission St., San Francisco, will bring you any of these useful and informative publications.**

VIBRATING SCREEN, "Utah" Electro-Magnetic type, details concerning construction operations and sizes available. Allis Chalmers Mfg. Co.

●

ELECTRIC HEATING; units and devices are illustrated, diagramed and specified for a variety of small applications; tables and data for heat calculations are appended. General Electric Co.

●

LABORATORY APPARATUS for educational institutions, illustrates equipment, describes instruction and demonstration purposes and experiments possible with each piece. Westinghouse Electric & Mfg. Co.

●

STREET LIGHTING, catalog section 60-250,-260, -270, illustrating and giving dimensions for cast iron, hollow spun granite, and union metal steel lighting standards, respectively. Westinghouse Electric & Mfg. Co.

●

SWITCHING EQUIPMENT, gives illustrations, diagrams, drawings, and full tables and descriptions. James R. Kearney Corp.

●

ELECTRIC FURNACES, colorless induction type, motor-generator operated, for melting ferrous and non-ferrous metals, photographs of installations and operations, descriptions, melting time. Ajax Electrothermic Corp.

●

TRANS-O-METER, a new portable instrument for direct reading of the transmittancy of flat materials, illustrated and described. The Westinghouse Electric & Mfg. Co.

●

FANS, ventilating equipment given a new treatment, applications illustrated, new markets suggested, title "Breezy Tales of Summer Sales." Smallcomb Electric Co.

●

MAGNETIC RELAYS, Bulletin 81, gives coil and contact data, arrangements, inclosures, illustrations, for more than 100 relays for intermediate duty, d.c. and a.c., two- and three-wire control. Ward Leonard Electric Co.

●

EQUIPMENT FOR FARM and rural homes, illustrated and described, unusual table of consumption translated into consumer use, example: churning—1 kw. hr. for 100 lb. of butter. General Electric Co.

●

WIRE AND CABLE, a pamphlet outlining types available including table of wire and cable data. Crescent Insulated Wire & Cable Co.

●

BUILDING WIRES AND CABLES, illustrates and specifies equipment, contains several pages of general information as wire gage tables, formulas for circuit calculations. General Cable Corp.

●

Industrial Wiring, laid out with charts in three colors, aims to serve engineers with a review of available types of wires and cables, color layouts illustrate typical supply circuits, tables cover practical limitations, Anaconda Wire & Cable Co.

ELECTRACIDE illustrates, describes means of electrocuting insects; photographs of applications and several devices both in commercial and ornamental designs; Folmer Electracide Co.

●

SWITCHING EQUIPMENT, pole top switches, fuse links, illustrated in color, installations shown, tables of ratings, indexed by number and alphabet, James R. Kearney Corp.

TESTED SELLING PLAN is an outline of sales promotion material available for Wesix heaters. Wesix Electric Heater Co.

●

FOOD REFRIGERATION contains charts, statistics and up-to-date information on the profitable operation of a modern food store. General Electric Co.

TRADE WIND MOTOR FANS, INC., Los Angeles, to enlarged quarters at 1325 Maple Ave. Manufactures and distributes air conditioning and ventilating equipment, A. G. Orear, president.

●

NICHROME, gives extensive, concise coverage of the properties and characteristics of alloys for electrical, mechanical and chemical purposes, Driver Harris Co.

# WHERE TO BUY IT IN THE WEST


TRY THE SUPER-POWERED JUMBO FIRST

IDEAL "JUMBO" cleaner Blows, Vacuums, Sprays. Powerful! Let us prove its superiority. 10 day free trial.

IDEAL COMMUTATOR DRESSER CO.
1042 Park Ave. Sycamore, Illinois


**Air Conditioning**
Frigidaire Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Kelvinator Corp.
Norge Division, Borg-Warner Corp.

**Ammeters and Voltmeters**
Ferranti Elec., Inc.
General Elec. Co.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec. Instr. Corp.

**Anchors, Guy**
A. B. Chance Co.
Everstick Anchor Co.
Hubbard & Co.
James R. Kearney Corp.
W. N. Matthews Corp.

**Anchor and Guy Rods**
A. B. Chance Co.
General Elec. Co.
Hubbard & Co.
Maydwell & Hartzell, Inc.

**Appliances, Household**
Chicago Flexible Shaft Co.
Edison Gen. Elec. Appliance Co., Inc.
Frigidaire Division
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Kelvinator Division
Leonard Division
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
National Enameling & Stamping Co.
Norge Division
Standard Elec. Stove Co.
The Silex Co.
Thermador Elec'l Mfg. Co.
Wesix Elec. Heater Co.
Westinghouse Elec. Supply Co.
The Woolwine Co.

**Belts, Safety Straps, Pole Climbers**
Western Hardware & Tool Co.

**Bells**
General Cable Corp.
General Elec. Co.
Superior Switchboard & Devices Co.

**Brackets, Wood**
Locust Pin Co.

**Breakers**
Air Circuit Breakers
Electric Material Co.
General Elec. Co.
I-T-E Circuit Breaker Co.
Roller-Smith Co.
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Oil Circuit Breakers
Allis-Chalmers Mfg. Co.
Delta-Star Electric Co.
Electric Material Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.
Roller-Smith Co.
Westinghouse Elec. & Mfg. Co.

**Bus Fittings**
Burndy Eng'g Co.
General Elec. Co.
Pacific Elec. Mfg. Corp.

**Buses**
Aluminum Co. of America

**Cable Accessories**
General Cable Corp.
General Elec. Co.
John A. Roebling's Sons Co.

**Cables**
Aluminum Co. of America
American Steel & Wire Co.
Columbia Steel Co.
Crescent Ins. Wire & Cable Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
Graybar Elec. Co., Inc.
Indiana Steel & Wire Co.
Maydwell & Hartzell, Inc.
National Elec. Products Corp.
The Okonite Co.
Okonite-Callender Cable Co.
Providence Insulated Wire Co.
Rockbestos Products Corp.
John A. Roebling's Sons Co.
United States Steel Corp.
Westinghouse Elec. & Mfg. Co.

**Carbon Brushes**
National Carbon Co., Inc.

**Carbon Products**
National Carbon Co., Inc.

**Chimes**
Square D Co.

**Clamps, Ground**
B. Hartman
Reliable Elec. Co.

**Clocks, Program**
Tork Clock Co., Inc.

**Coffee Makers**
The Silex Co.

**Coil Winding**
Jeffries Transformer Co.

**Commutator Dressers**
Ideal Commutator Dresser Co.

**Compounds, Insulating**
Clifton Mfg. Co.
John C. Dolph Co.
General Cable Corp.
General Elec. Co.

**Condensers, Electric**
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Conduit**
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

**Conduit, Flexible Metallic**
General Elec. Co.
Wiremold Co.

**Conduit, Underground**
Fire Proof Wall Co.
Johns-Manville Corp.

**Connectors**
Burndy Eng'g Co.
G & W Elec. Specialty Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Reliable Elec. Co.
L. W. Thompson

**Controllers**
Allis-Chalmers Mfg. Co.
Betts & Betts Corp.
General Elec. Co.
Square D Co.
Westinghouse Elec. & Mfg. Co.

**Cutouts**
G & W Elec. Specialty Co.
General Elec. Co.
James R. Kearney Corp.
W. N. Matthews Corp.
Schweitzer & Conrad, Inc.
Westinghouse Elec. & Mfg. Co.

**Demand Control**
General Elec. Co.
Wesix, Inc.

**Distribution Specialties**
G & W Elec. Specialty Co.
General Elec. Co.
Hubbard & Co.
James R. Kearney Corp.
Maydwell & Hartzell, Inc.
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Shell Oil Co.
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